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At Last!

IT is many years since *Flight* first mentioned the possibility of arranging a flat rate for Empire air mails, and since that time there have been a number of notable sponsors for the scheme.

Now, at last, our progressive Postmaster-General has inaugurated a system whereby letters are sent to Imperial destinations at two distinct rates—3d. and 6d. for each half-ounce. Naturally, correspondence to certain places costs no less than before; users of the India air mail, for instance, do not benefit in any way, though people who are sending letters to Malaya gain as much as sixpence on the new rates.

But simplicity is the salient feature of the new development. There must be thousands of people who would be only too pleased to pay a little extra for the benefit of having their letters read a few days—or weeks—sooner, and consequently of receiving a quicker reply. These people have only been deterred by reason of the relative complications involved.

Everyone who has posted a letter to a part of the Empire knows the stamp or stamps that are required, but few have known the poundage necessary for air-mail letters, and in their ignorance they have imagined the affair to be a great deal more complicated than it actually was.

A start has been made. The twin rates are still high in comparison with those for surface transport; but, as the air is used by more people, these will undoubtedly settle down. Some day, we hope, all mails will be sent by air as a matter of course—at the present surface rates.

For the present we must be content with the fact that internal mails are to be sent by air when such a course will expedite delivery and where a suitable air line company has entered into contract with the Post Office. In other words, all mails are, theoretically, air mails, and there will be no necessity for the sender to affix an air-mail label or to examine an Air Bradshaw before posting his letter.

In Paris

FEW of the thirteen Paris Aero Shows which have preceded it have equalled in interest the *Quatorzieme Salon de l'Aviation*, at present being held in the Grand Palais des Champs Elysées, Paris. Perhaps there is some significance in the fact that the word *Aviation* has been substituted for *Aéronautique*. The subject is certainly becoming one of plain flying rather than one of more or less obscure science—at any rate to the man in the street.

Curiously enough, the change in the title seems to have coincided with the total disappearance of "freaks." At each of the thirteen previous Paris shows one could always count upon a certain number of mirth-provoking contraptions. This year there is not even an unorthodox machine, if one excepts two or three which are discreetly tucked away on the first floor, where one may easily miss them altogether. There is an air of apology about this hiding of the three novelties. One is the Mignet "Pou du Ciel," described and illustrated in *Flight* recently. The second is the "all-wing" monoplane, fitted, incidentally, with a Pobjoy engine. Whether or not this actual machine has flown, several of similar type have, and there is nothing impossible, or even very speculative, about the principle. The third is a rather unusual amphibian flying boat, in which the wheels are partly housed in the outboard floats. The take-off from the water may be somewhat impeded by the projecting wheels, but there is no reason to think that the machine does not represent quite a workable scheme.

For the rest, the seventy or so aeroplanes and seaplanes, with the two other amphibians, are all fairly straightforward types with no nonsense about them. They all appear serviceable craft, some prettier than others, but each and every one obviously capable of doing the work for which it was designed.

As might have been expected, small civil types are in the majority. They include something for every

taste, from the cheap little open two-seater to the luxurious cabin four- to five-seater. In the large commercial class there are not very many, but some are very interesting. For example, the new Breguet 46T is obviously one French answer to the Douglas D.C.2. At the show it is exhibited with a wooden fuselage, but we were informed that this is to be regarded as a rather elaborate "mock-up," and that the actual machine will have an all-metal ("stressed skin") fuselage. The machine is not unlike the Douglas in general layout, and the designers expect a cruising speed of more than 200 m.p.h. from it.

On the military side the show is far less likely to be a useful guide. The French Air Ministry is not, probably, any more willing than those of other nations to permit constructors to exhibit the latest types, so that of those which are shown probably some are due to be superseded in the near future. For all that, the military types are interesting, particularly on account of the diverse ways in which armament is carried. The French way, in bombers and similar types, seems to be to start with a fairly clean design (cantilever monoplanes with retractile undercarriages) and then to build "annexes" on to it in order to give gunners and bombers both view and protection. The result must be a fairly serious drop in performance, but the arrangement does give machine gunners, for instance, an opportunity to work their guns, even when the machine is flying at full speed.

Although some highly interesting examples of all-metal construction are being shown, there is a definite tendency to break away from what had at one time become almost a fetish. In the case of the French constructors this is due to a decision by the French Air Ministry no longer to insist that all military machines must be built entirely of metal.

The diesel engine is gradually making its appearance, and more than one firm is now working on its development. To Great Britain, however, goes the credit of being the only country to exhibit two sleeve-valve radials. In the circumstances, the reticence of the "Bristol" company to disclose structural details is understandable.

At previous Paris Aero Shows nearly every French aircraft constructor of note has been represented. This year there are, unfortunately, several whose machines one would very much have liked to see, but who for one reason and another have not been able to exhibit.

To the best of our knowledge, this is the first of the Paris Shows at which no Blériot is to be found. It is common knowledge that M. Blériot's firm has had rather a struggle against difficulties for some years, but whether this is the reason, or whether lack of space is to be blamed, is not clear.

ARTISTRY: A *Flight* photographer's impression of the Caudron C.450 which won the Deutsch de la Meurthe Cup Race this year. It is most effectively displayed at the Paris Aero Show.

The Outlook

A Running Commentary on Air Topics

Bidding for the Mails

ON several occasions since the inauguration of internal air mails *Flight* has complained of the inequity of the contracts. At one time it seemed almost as if Highland Airways was to be the only "free" operating company carrying mails, in spite of the fact that two or three operators had proved their ability to run regular and reliable services.

Now, however, the pendulum has swung the other way, and the carriage of mails has been made a matter of bidding. Already Hillman's Airways have obtained the mail contract to Belfast and Glasgow, and other companies will doubtless receive similar opportunities in due course.

Among all the independent operators, Mr. Edward Hillman probably deserves the greatest credit for his courage and determination during a period when air transport has, to say the least of it, been studied by both officials and public with a somewhat jaundiced eye. His services, too, have been run in a business-like and, consequently, economical manner. Nevertheless, we feel that the London-Glasgow route is the very one in which a change of contract was *not* altogether desirable. Railway Air Services have run an efficient and fast service with the best possible equipment, and has charged, in the past, a very reasonable sum for the mails. However, the system of awarding contracts to the lowest bidder who, at the same time, can run a reliable service, is sound in itself, and such changes are inevitable.

Flying Boat Services

SOME months ago we commented on the risk that Great Britain might be left behind in the race for commercial flying boat supremacy. Since then the position has become a little clearer, due chiefly to the announcement by Sir Eric Geddes that new boats are being built for Imperial Airways, Ltd. A very considerable delay must, of necessity, occur before the British boats can be launched, and in the meantime the United States, France, and Germany are making great efforts towards the development of long trans-oceanic air routes.

This week a reader outlines a suggestion for the use of flying boats on sections of the Empire air routes. We have no doubt that Imperial Airways are fully alive to the relative advantages of flying boats and landplanes, and the time factor is the only feature which may cause any uneasiness. Whether Imperial Airways intend to use the new flying boats on the Western or Eastern end of the England-Australia route is not at present known, nor is the question of any immediate importance. The main thing is that we now have an assurance that something will certainly be done.

An Achievement

ALTHOUGH Igor Sikorsky's lecture to the R.Ae.C. (dealt with on p. 1259) did not add a great deal of information to that which was already known—much of which has been published in *Flight*—it did give certain definite figures which form a very useful basis from which to judge the merits of the new large Sikorsky S-42. For example, the statement that the maximum lift-drag ratio exceeds thirteen is interesting, and shows that aerodynamic efficiency of a high order has been achieved.

If the figures of empty and loaded weight are examined, it will be found that here also the efficiency is very high. For a tare weight of 19,764 lb. the loaded weight is 38,000 lb., giving a ratio of gross weight to tare weight of 1.92. This means that the S-42 can carry as disposable load 92 per cent. of its own weight. Actually, this figure for empty weight refers to the machine stripped.

Elsewhere in Mr. Sikorsky's paper it is stated that the passenger and such equipment weighs 2,181 lb. If to this is added the stripped tare weight, the figure becomes 21,945 lb., giving a ratio of gross to tare weight of 1.73, so that, fully equipped for carrying passengers, the machine is still able to carry, as disposable load, 73 per cent. of its own weight, which is a very good result.

Economy

IN the matter of operational economy, the figures given in the paper require some little explanation in view of the difference between certain British and American units. For instance, in the paper it is stated that the mileage per gallon is 1. In view of the fact that the American gallon is smaller than the British Imperial gallon, this figure becomes 1.17 miles per Imperial gallon. As the American ton is 2,000 lb. compared with the British 2,240 lb., the figure of ton-miles per gallon is not greatly affected, being 4.43 ton-miles per gallon as compared with 4.25 ton-miles per gallon in the American units. The figures, again, are good, particularly in view of the fact that they relate to a cruising speed of 157 m.p.h.

Altogether, the Sikorsky Aviation Corporation and Pan-American Airways are to be congratulated on the high achievement which the S-42 represents. It will be interesting to compare the performance figures of the boats which have been ordered by Imperial Airways.

Safe Flying

IT has always been our contention that any prophecy dealing with the future of aviation, in which the air is visualised as filled with hundreds of thousands of "little men" all flying their own aeroplanes, will remain basically unsound until means are invented which will make it easy and safe to fly through any and every form of weather. At the present time that is only possible for expert pilots working with the full help of a well-organised ground control and of wireless.

The pitch of perfection to which control has been brought on our regular air lines was brought out recently when we were flying to and from Paris by Imperial Airways. For their pilots bad weather does not mean crawling about close to the ground under clouds. They go right up into the glorious clear atmosphere, sometimes over an endless sea of billowing cotton-wool. They know, through the wonderfully efficient control at Croydon, where they can go with perfect safety, and, what is perhaps even more amazing to the uninitiated, where they are and when to come down. In fact, on our last flight the first thing we saw as the clouds parted underneath us on our way down was the aerodrome-marking circle at Croydon.

This is safe flying, and it is for good reasons, when the weather is thick, that steps are taken to keep all aeroplanes without wireless out of the track of the regular air liners.

THE FOURTEENTH

The Exhibits Described in Detail : C
Seventy Machines : Small Quantity
No "Freak" Designs : French Tende

JUDGING by the exhibits in the Quatorzieme Salon de l'Aviation, which was officially opened last Friday by M. Albert Lebrun, President of the French Republic, the period of two years which has elapsed since the last Paris Aero Show has been one of consolidation rather than experimentation.

Two years ago it was possible to state that with a few exceptions there was not in the Grand Palais a single aircraft which had not either actually flown, or which had, at any rate, quite a reasonable prospect of flying fairly well. This year the exceptions have disappeared, and there is not a single "freak" in the show. This is not by any means a sign that inventive genius is languishing, but rather an indication that there are so many really practical machines in existence that it has become very difficult for the harebrained inventor to "raise the wind." Of inventive talent there is no lack, and the diversity of types to be seen in the Grand Palais is proof of the fact. But invention is taking practical forms.

Although a few large military types tend, by their very size, to overshadow the smaller craft, a tally of the exhibits brings to light the fact that out of a total of close upon seventy complete aircraft only twenty-one are military types. This number does not include machines intended for training in flying, bombing, gunnery, and so forth. On the whole, therefore, it can be said that civil aircraft predominate.

It is worthy of note that for their military types French designers appear to lean more and more to the monoplane. The equal-span biplane has, apparently, disappeared, but the "sesquiplane," *i.e.*, a biplane with a quite small lower wing, is still holding its own. Generally speaking, the all-metal cantilever monoplane seems to be favoured for large twin-engined types, while the high-wing monoplane, generally strut-braced, is much in favour in the single-seater and two-seater classes.

All-metal construction has by no means ousted "mixed" construction. In fact, the French Air Ministry has lately shown itself willing to accept a return to the metal-and-wood composite construction which was common six or seven years ago. This is interesting in view of the British Air Ministry's adherence to the all-metal principle. For a time the Paris Aero Shows bore evidence of a frantic struggle for new forms of metal construction, and particularly in the direction of stressed skin construction. For certain types this form is still used almost exclusively, but there are signs that it is not now gaining ground very rapidly.

Where metal is used, duralumin appears still to be the favourite among French constructors, whereas the designers of other nations are more divided. In Great Britain we have, of course, used high-grade steels to a greater extent, and examples are to be found at the Show in the Hawker, Armstrong-Whitworth, and Avro machines. The new

This combined Armstrong-Whitworth and A. V. Roe stand is one of the most attractive in the Show. All the three machines are painted white, with their exposed metal surfaces plated.

PARIS AERO SHOW

wenty-one Military Types Among Nearly
'igh Quality in the British Displays :
owards Monoplanes for Military Work

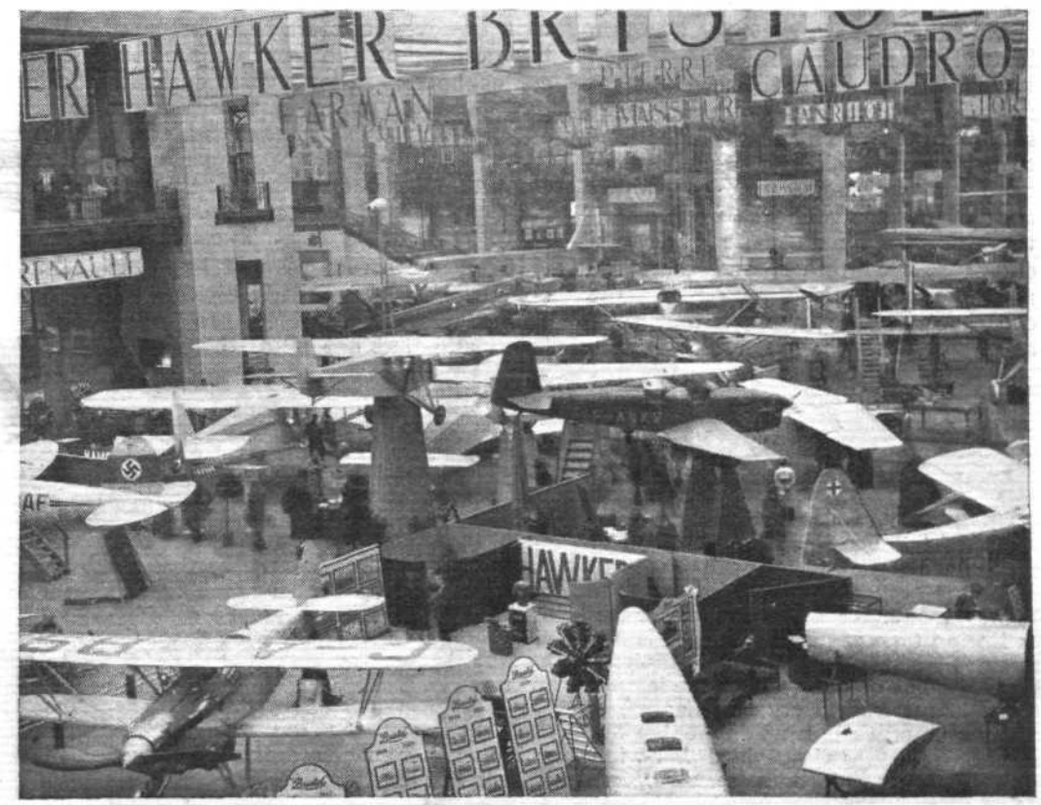
Bristol commercial twin-engined machine, of which portions only are shown, is by way of being an exception to this rule. The entire fuselage is of light alloy construction, although the wing spar booms are of steel. This type of construction, incidentally, is extremely interesting, and makes use of what Mr. H. J. Pollard called, in an article in *The Aircraft Engineer*, by the descriptive if not very euphonious name, "Developable Surfaces." That is to say, although the general form of the fuselage is rounded, it is so planned that flat sheet metal can be used for covering without resorting to panel beating.

Two examples of stainless steel construction are shown, curiously enough, in corresponding corners at opposite ends of the exhibition. One takes the form of a complete wing skeleton for a Hawker "Nimrod," and is naturally a very fine piece of work. The other is a Russian civil five-seater cabin machine, in which the use of stainless steel is probably not justified by the type of aeroplane to which it is applied. It is interesting, nevertheless, as an example of what Russian workers can do. Joining is done entirely by shot-welding. In the Hawker "Nimrod" wing riveting is, of course, used for joining strips together. Another example of shot-welding is to be found in the Savoia amphibian on which, last year, Capt. Rex Stocken made demonstration flights in many parts of the British Isles. It is somewhat difficult to determine the structural details of many of the aeroplanes exhibited, as only those to which reference has been made are exhibited "in skeleton."

Retractile undercarriages are, as was to be expected, gaining popularity very rapidly. A large number of machines are fitted with them, and, in addition, examples are to be found on the stands of the French firm of Messier and on the British stand on which Capt. Rex Stocken is showing a number of British products. The latter exhibit includes the Dowty hydraulic type. Incidentally, his many friends will be sorry to learn that Capt. Stocken was taken ill just before the opening of the Show, and was, when we left Paris, confined to his hotel.

Two main types of retractile undercarriages are to be seen: those in which the wheels swing back and up in a longitudinal plane—these are mainly used for twin-engined types—and those in which the wheels swing out and up laterally, for use in single-engined types where the wing itself forms their housing.

Controllable pitch airscrews are to be seen on many of the aeroplanes exhibited, but the detail design appears to be still in a state of flux, and there is no unanimity about ways and means. The American Hamilton C.P. propeller is found frequently, and among French designers Pierre Levasseur and P. Ratier are well represented. The Gnome-Rhone engine company is developing a type of their own, but in France as in this country



A general view of the Salon. In the foreground are corners of the Hawker and Bristol stands, and prominent in the centre of the picture is the Caudron "Aiglon," a two-seater open cockpit development of the Caudron which won the Zenith Cup.

In the centre of this display is the Breguet 46T as it will look when finished. Two Mistral Major engines of 880 h.p. each are expected to give it a top speed of 240 m.p.h. In the foreground is the Dewoitine D.511, France's latest and fastest fighter. (*Flight* Photo.)

opinions seem to be still divided concerning the question of whether or not a controllable pitch airscrew is really "worth its keep" except on certain limited types of machines.

On the engine side the development appears to have been more and more in the direction of full supercharging to considerable altitudes, and all the engine firms now produce supercharged models. The battle between the water-cooled and the air-cooled engine still continues, and there are no signs of either type ousting the other. A notable feature is that quite a number of French aircraft with water-cooled engines are fitted with nose radiators. In England these were abandoned years ago. The new custom, however, appears to be to carry the radiator on the front ends of the engine bearers, allowing its edges to project, and sweeping the fuselage covering in behind so that there is a large gap through which the air can escape. It seems likely that a "Townend Ring" effect is present, or could be obtained.

For a number of years it has been obvious that the French aircraft industry was composed of too many firms, and that not all of them could possibly flourish. The natural solution of the problem was amalgamation, and the Paris Show indicates that amalgamations and combines have come into being to a very considerable extent. For instance, the Breguet firm has, as pointed out in *Flight* last week, become the central organisation of a very important group, which includes such famous firms as Wibault-Penhoët, Couzinet, Mauboussin, and Morane-Saulnier. Another group is known as the Union Corporative Aeronautique, and includes Louis Bleriot, the Farman brothers, and A.N.F.-Mureaux.

THE EXHIBITS DESCRIBED

Large Civil Machines

PROBABLY most prominent among the civil machines in the Salon is the large Breguet low-wing monoplane, which is generally regarded as the French answer to the American Douglas or Boeing type of machine. This is not to say that such an answer is definitely intended, but obviously there are lessons to be learnt from every manufacturer's machines, and there is no doubt that the well-streamlined twin-engined low-wing monoplane has gained, in recent years, a first place in the consideration of commercial operators.

The Breguet 46 T (or "Fulgur" as it is officially designated) is a large all-metal machine with two Gnome-Rhone "Mistral Major" engines giving 880 h.p. each. These are well cowled into the wing, so assisting the attainment of a top speed of 385 km.p.h. (239 m.p.h.). Seating twelve to fourteen passengers in the long, well-lighted cabin, this machine should be comfortable, and, with its ample wing flaps, the landing speed should not be unduly high.

The retractile undercarriage is particularly robust, with each compression unit in the form of a pair of combined cylinders at the top of the forward struts on either side of the wheels. By means of broken radius rods each wheel is swung upwards and backwards into the space behind and underneath the engine mountings.

Next in size is the three-engined Avia 51 with an all-metal stressed-skin fuselage not unlike the form first brought into prominence by the Lockheed "Vega," and with fabric-covered metal wing and tail units. Six passengers are provided for in comfortable seats, although the large cabin appears to be slightly overcrowded.

The engines, three Avia R 12s of 200 h.p. each, are fitted with a form of N.A.C.A. cowling, but, despite this, their arrangement makes it appear that their respective slipstreams might interfere considerably with each other. The airscrew paths overlap, so that the resultant airflow, particularly under the wing roots, is probably very disturbed indeed.

With 600 horse-power, this machine is certainly not under-powered, but it did not impress us as being "just anybody's machine."

The Farman 431, with Gipsy engines, has already been illustrated in *Flight*. At the Salon the latest version is fitted with Renault "Bengali Six" engines of 190 h.p. each, and is certainly one of the most beautifully finished machines exhibited. The fuselage, in general shape, is peculiarly reminiscent of the "Dragon," but, as it is a low-wing monoplane, the resemblance ends there.

With a top speed of 245 km.p.h. (152 m.p.h.) the 431 has a performance which should make it a fairly attractive proposition to commercial users. The construction is mainly of plywood, and the fuselage has very large windows running the whole length of the cabin and giving considerably more light than is usual. The undercarriage is of the conventional three-strut type, and it is rather surprising to find that it is not retractile in standard form.

This is, however, the case with the Potez 56, a low-wing monoplane with two Potez 9ab nine-cylinder radial engines of 185 h.p. each, having accommodation for five to eight passengers. The undercarriage halves fold upwards and backwards into the bases of the engine nacelle fairings, which are, in effect, continuations of the complete ring cowlings encircling each engine. The fuselage and the wing are built up from spruce and plywood. The maximum speed is 275 km.p.h. (170 m.p.h.).

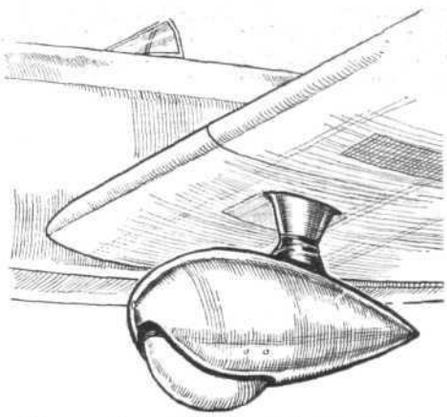
Somewhat nebulous, but worthy of incorporation in this section dealing with the larger civil machines, is the Bristol 143. This actually consists of the front half only of the fuselage, and has been erected on the Bristol stand, where it serves primarily to indicate the method of construction of the fuselage and wing roots.

The former is metal monocoque, a system which is further exemplified by other portions of fuselage on the stand. The light alloy sheet is riveted to stringers and formers, making an extremely clean whole. The wing roots show the form of spar construction used—a deep alloy flange with strip steel booms—and also show how the fuel tanks are to be accommodated in them.

Not far from the Bristol stand there

The French President, M. Albert Lebrun (right), being welcomed by M. Louis Bleriot (left) at the opening of the show.

is the Heinkel He. 70. This machine has been seen in England and has been described very fully in *Flight*. In the



Unusual cantilever undercarriage on the Caudron C.600.

raised position which it is given at the Salon it appears a most impressive aeroplane. As shown, it has seats for four passengers, but it would seem to be more fitted for the carriage of mails, for the passengers' comfort appears to have been largely sacrificed in the cause of speed. With a B.M.W. 630 h.p. engine the top speed is 222 m.p.h.

The last machine to be included in the "larger civil" category is the Farman 393. This is the latest model of the well-known high-wing monoplane with the Farman 190 h.p. engine, and seats five passengers not including the pilot. Machines of this type have flown all over the world, as, for example, to Saigon piloted by Vicomte de Sibour.

Small Civil Types

THERE are at the Salon many machines, some of great interest and some already well known, which may be classed under this heading.

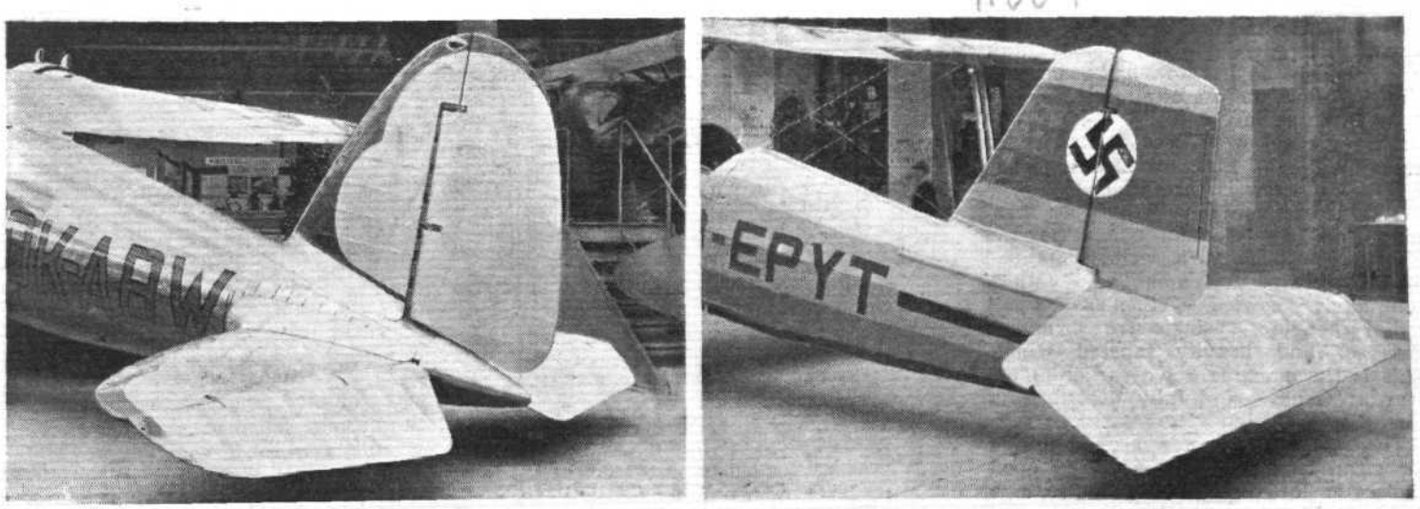
On the German stand there are two in particular which are well worth study, these being the Fieseler and Messerschmitt Me 108, both being built to fulfil the requirements of the *Challenge de Tourisme* held recently in Warsaw.

The Fieseler, in order to achieve a low landing speed and good take off together with a high top speed, is compensated for a comparatively small wing area by having Fowler flaps which drop out and back from the whole length of the trailing edge of the wing and thereby increase the effective area by some 33⅓ per cent. Added to this, Handley Page slots extend inwards from the wing tips for about two-thirds of the span.

The ailerons are particularly interesting, as they are of the short-span type and work upwards above the surface of the outer portion of the Fowler flaps.

Rather different is the Messerschmitt. In this machine the flap is a very long one of the normal type which droops from the trailing edge of the wing and extends along its span as far as the aileron, but in this case the ailerons are about twelve inches in width and very little deeper in chord. Reports from one who witnessed the trials at Warsaw suggest that they were not adequate in rough weather—a statement with which no one will quarrel after seeing the machine.

Both these machines were specially

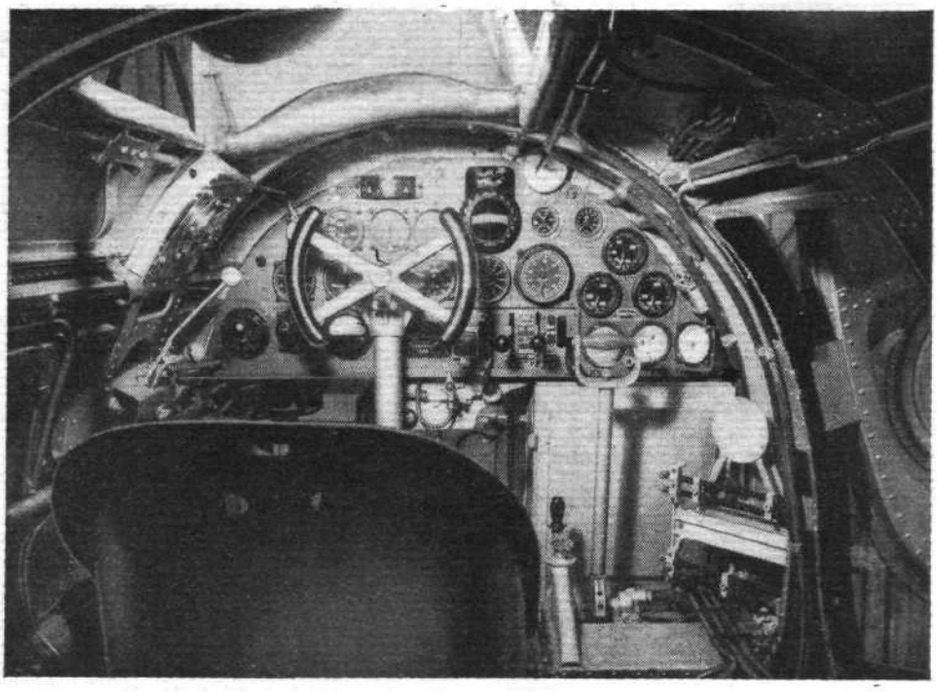


The photograph on the left shows how carefully the fin and tail plane of the Avia 51 are faired into the metal fuselage. On the right are the tail units of the Arado 69—an unusual arrangement obviating the necessity for a split elevator and possibly reducing spinning tendencies. (*Flight* Photo.)

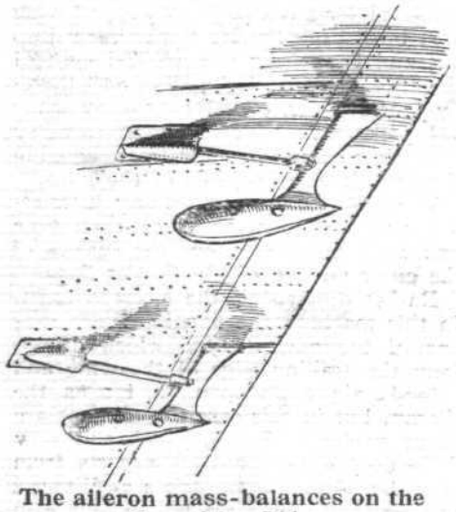
designed with a view to scoring marks in the competition, and their cabins are certainly more comfortable than anything so far seen in this class. Each has extensive transparent panels both above and at the sides so that passengers and pilot have an unrestricted outlook and a sense of space and airiness. The seats are, in each case, arranged in two pairs facing forward, and appear to be very comfortable.

The Fieseler, with its 225 h.p. "Argus AS17" engine, claims a top speed of 250 km.p.h. (155 m.p.h.) and a landing speed of 60 km.p.h. (37 m.p.h.), while the Messerschmitt, using a "Hirth" eight-cylinder inverted 250 h.p. engine, flies at 310 km.p.h. (193 m.p.h.), and lands at 60 km.p.h. (37 m.p.h.).

Another point of interest to which we have not yet become accustomed, except perhaps in some of the more modern large commercial aircraft, is the almost vertical front used on the windscreen of both machines. Remembering that they were designed for high speed, among other things, it would appear that there is considerable truth in the assertion that a blunt nose of the correct shape often produces less drag than one smaller but more pointed.



The cockpit of the Heinkel He. 70, the fast German mail-cum-passenger plane for which a top speed of 222 m.p.h. is claimed.



The aileron mass-balances on the Dewoitine 511.

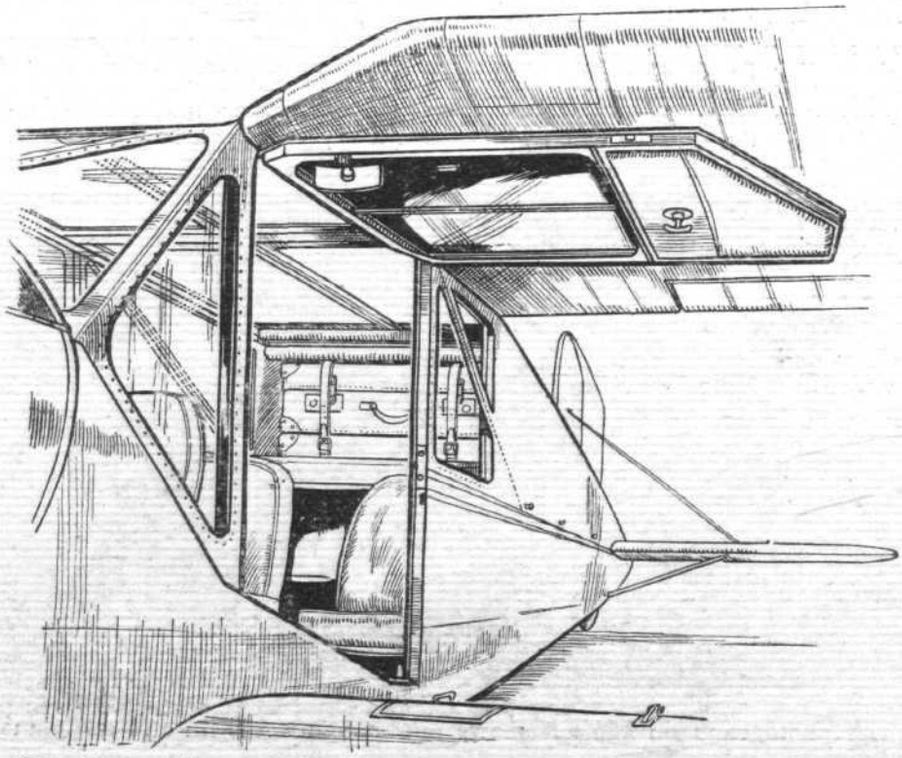
As in the case of most machines in the competition, full advantage was taken of the rule whereby the pitch of the airscrews was allowed to be altered according to the necessities of each test. Although the weight limit under which the machines had to be built did not allow the use of airscrews which were variable in the air, those variable on the ground were used, and each of these had light Elektron blades. The B.F.W. airscrew is three-bladed.

Another somewhat superior light aeroplane on the German stand is the Messerschmitt M35, a well-streamlined low-wing two-seater monoplane with a completely cowled "Siemens 14a" radial engine, single-strut undercarriage, and heavily tapered wings. This is the machine flown earlier in the year at Geneva and fully described in *Flight* at that time.

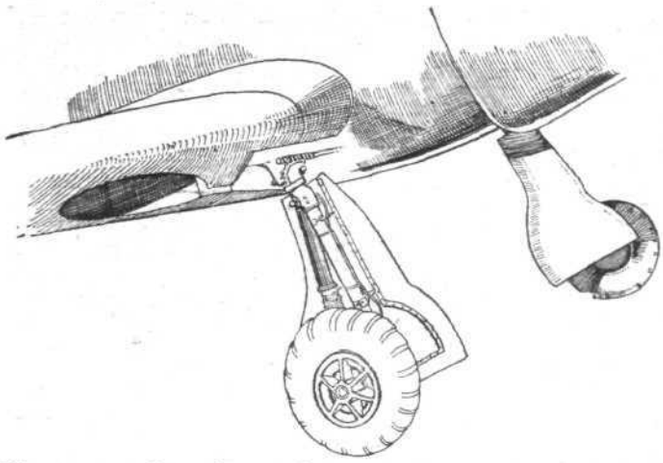
There are four Caudron machines in the small class. The C600 is an open two-seater low-wing monoplane with a single-strut undercarriage that hardly looks up to its job. It is, nevertheless, advertised as suitable for school work and the undercarriage must, presumably, be strong enough. With the Renault "Bengali" engine the machine has a speed range from 60 km.p.h. (37 m.p.h.) to 200 km.p.h. (124 m.p.h.), which, as it has no flaps, suggests that it must be clean aerodynamically.

Most interesting of the Caudrons is the C 520 *Le Simoun*. This would appear to be the tourist development of the "Raphale" which won the Deutsch de la Meurthe Cup. The low wing is very like that of the racing machine, but it has a four-seater cabin, with the passenger seats placed in pairs. The machine is beautifully finished, the plywood having been well rubbed down and the cellulose surfacing well polished. Powered with the Renault "Bengali Six" inverted engine, the top speed claimed is 320 km.p.h. (199 m.p.h.). The landing speed, 75 km.p.h. (47 m.p.h.) is low, because long wing-flaps are used. A Ratier controllable-pitch airscrew must contribute very considerably to this performance.

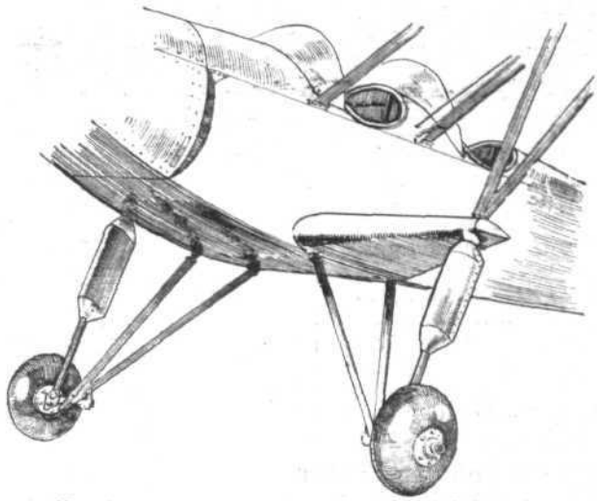
Extraordinarily like our own D.H. "Leopard Moth" is the C480 *Fregate*. The performance with the four-cylinder inverted Renault "Bengali" is from 75 (47 m.p.h.) to 215 km.p.h. (133 m.p.h.). the main differences are that the doors have, like those of the Caudron "Phalene," which was also shown in a modified form, been



This is how the special suitcases are arranged in the Hanriot 180 T.



The unusual undercarriage of the Messerschmitt Me 108, which is retractable by means of a worm and worm wheel.



Streamlined outriggers carrying the undercarriage and wing struts of the little Potez 60.

made to open upwards, and this, perhaps, makes it somewhat easier to enter than similar machines. The tail units have also been altered slightly so that the rear end of the fuselage extends further aft with the rudder above it, the shape of the latter also being similar to that of other Caudron models. This machine is advertised at 48,350 fr., which is lower than anything of a similar type which can be produced in England.

The P.Z.L. 26, a low-wing three-in-line three-seater, is an interesting small machine because, like the Germans already described, it was built especially to compete in the *Challenge de Tourisme*. It is a cantilever low-wing monoplane built mainly of metal with fabric covering. The undercarriage is of the single-strut type, with the upper portion faired in with fabric.

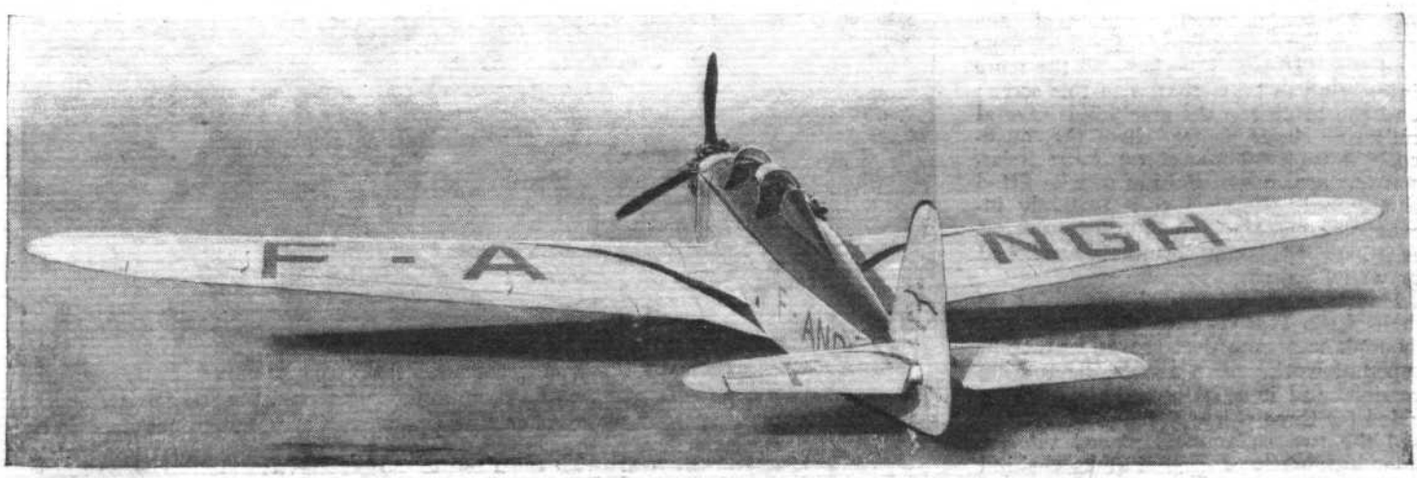
Particular attention has naturally been paid to producing a machine with a high top and low bottom speed, so it is fitted with Zap-like flaps and has slots along the outer portion of the leading edge of the wing. Most interesting is a slot of small span but large chord, which forms the leading edge of each wing root and is said to smooth out the flow at the stalling point to such an extent that there is no evidence of loss of tail control or of incipient buffeting even at the high angle of flight achieved with the flaps and slots in full action. With the Menasco "Buccaneer" engine of 265 h.p. the performance ranges from 300 km.p.h. (186 m.p.h.) to 64 km.p.h. (40 m.p.h.).

Two Autogiros are at the Salon. One, on the A. V. Roe and Co.'s stand, is of the C.30a direct-control type which that company is now turning out in large numbers. The other, also a C.30, is actually one from the Avro factory, but is there on the Lioré stand as evidence that that firm has an Autogiro licence.

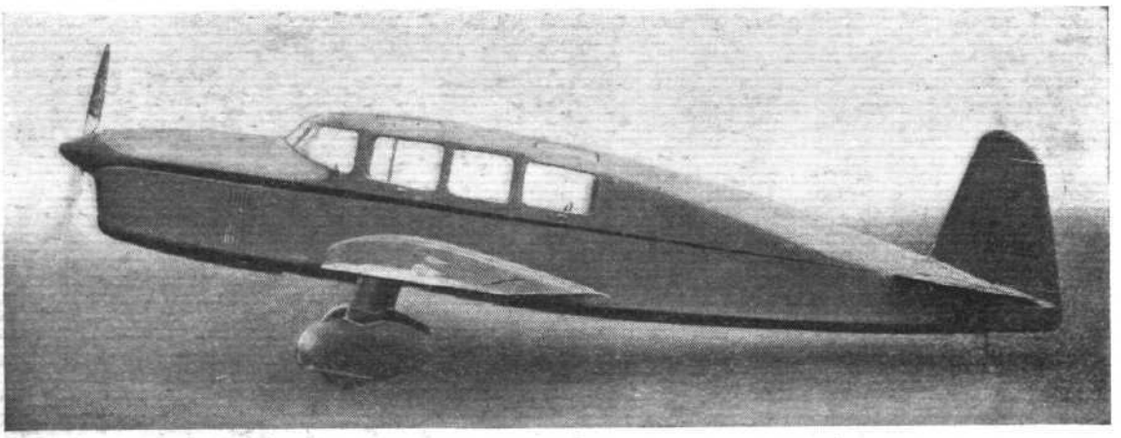
Single-seater enthusiasts—and there are many, despite the generally expressed opinion that there is no sale for such types—will be interested in the Magni "Vale." This is a beautifully finished little high-wing monoplane shown on the Italian stand. Its Farina engine (130 h.p.) has a polished copper ring cowling which, with the deep red colour of the fuselage and wing, made the machine perhaps one of the most attractive in the Salon. It is, however, certainly not the kind of machine which everyone would want to fly. The performance claimed is from 90 km.p.h. (56 m.p.h.) to 250 km.p.h. (155 m.p.h.).

The Potez 60, with the three-cylinder 60 h.p. Potez engine, is a French attempt to satisfy the demand for a very cheap and light club machine.

The collaborative Russian exhibit includes a good-looking small low-wing two-seater with a five-cylinder radial engine of about 100 h.p. Both the ailerons and flaps are of the slotted type and the whole layout impressed us as looking "just right." Its official title is A.I.R.9.

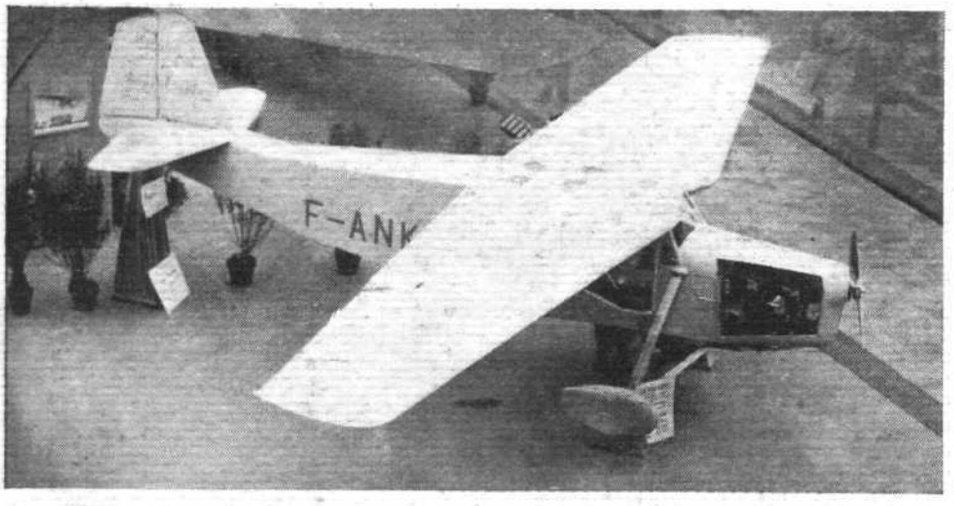


Another French example of a cheap machine—the little Mauboussin "Corsaire," which is also supplied in a cabin version. The engine may be a Salmson or a Pobjoy.



A development of the "Rafale," the Caudron 520 seats four persons, and with its Renault "Bengali Six" a top speed of 199 m.p.h. is claimed.

There is nothing new about the two smaller Farmans, the 493 and 494. These are both of the three-in-line type of high-wing cabin monoplanes of wooden construction, and have been described fully in our pages. The former has the Farman 7-cylinder radial engine, and the latter a Renault 4-cylinder inverted "Bengali" of 140 h.p. The wing is cantilever and the undercarriage compression leg is led up to the top longeron at the junction of the wing root.



Very English-looking despite its registration letters, the Caudron "Freygate" carries two passengers seated side by side behind the pilot. (*Flight* Photo.)

The little Mauboussins, the 112 and 120C, are creating quite a lot of interest because they are pretty little machines of the Klemm type, and, as usual, people were saying that that was "just the sort of machine they would like to fly." Both are two-seaters, the former of normal open-cockpit type and the latter with a large transparent cabin roof. The windscreen is the only one in the Salon which has, like some of the modern American high-speed commercial aircraft, a very pronounced forward slope and vee. It was, therefore, all the more interesting to learn that with this screen and the cabin top the machine is several miles an hour faster than the open-cockpit type. Those shown have Salmson engines, but a Pobjoy can be fitted if required. Being a comparatively inexpensive machine this, the "Corsaire," as it is called, is not very highly polished or well finished.

Hanriots show several examples of their H 180 T, a versatile little high-wing monoplane arranged for several different types of work. The 180 is the touring version, and in this form seats are provided for three persons, the pilot in front and the two passengers, placed side by side, in slightly staggered seats, behind him. The internal upholstery is well done, but we feel that most normal-sized men would find the seats somewhat inadequate.

In general design the 180 is a high-wing monoplane with a small stub wing extending from the lower longerons. This extension contains the fuel tanks and serves, at its outer end, as a junction for the Vee wing struts and the single strut undercarriage, so that the machine might, perhaps, be called a semi-sesquiplane monoplane.

With the "Bengali Six" engine the top speed claimed is slightly over 200 km.p.h. (124 m.p.h.). The general construction is interesting as the fuselage is built of square duralumin tubes with flat shallow channel-section bracing strips riveted to flitch plates, these bracing strips appearing to be riveted in under tension. The rear portion of the fuselage has a demountable top decking which is built up of plywood and can be removed so that another of different design, according to the work required, can be substituted.

The Potez 58 is another high-wing cabin monoplane which is fairly well known in England. With permanently open wing tip slots, it always attracts attention to itself wherever it goes. The three seats are arranged with two side-by-side in front. The engine generally fitted is the Potez six-cylinder radial of 120-140 h.p.

New and interesting is the little Potez 60, a machine built under the Government subsidy scheme for producing very light and inexpensive machines "for the multitude." The 60 has the three-cylinder Potez radial engine of 60-70 h.p., and is an open two-seater parasol monoplane. The usual Potez system is adhered to of having a stub extending from the bottom longerons to which the undercarriage is attached, and in this

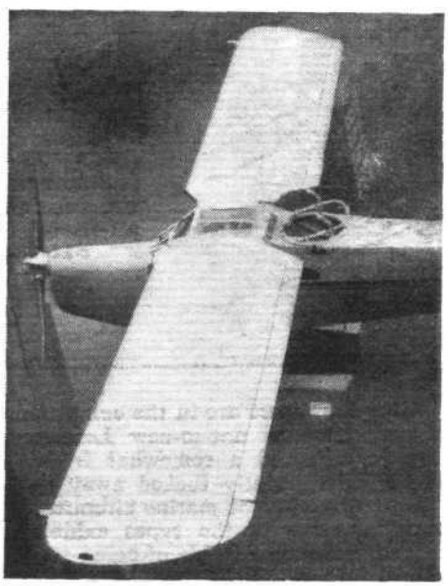
The Hanriot 180 T, a small sesquiplane so constructed that the top of the rear portion of its fuselage is interchangeable, thus enabling the machine to be used for a variety of purposes. (*Flight* Photo.)

case the stub is carried out a little farther than usual, and is faired so that it forms a diminutive lower plane and, maybe designedly, a step by which to reach the cockpits. On the whole it appears to be a feasible proposition, though rather too light for serious use.

School and Training Types

THROUGHOUT the Show there is a fair leavening of types which can justifiably be classed as suitable for school and training work, although it is somewhat disappointing to find that there are only very few machines showing evidence of the fact that their designers have studied the problems of training as a separate branch of aircraft design.

Probably the best known training aircraft in the world are the Avro types, which have consistently been developed for this service. Certainly the Avro 626, which shines so brightly in its white paint and chromium polish, on the A. V. Roe stand, is equipped more fully in this respect than any other. As our readers well know, it can be adapted to serve the requirements of flying training,

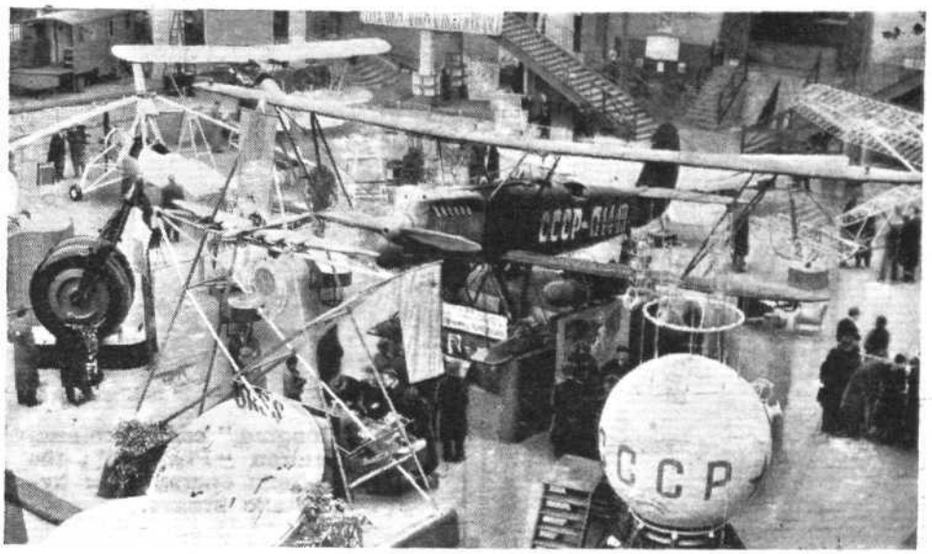


The military training version of the cabin Hanriot, in this case called the 190m. The rear cockpit has been arranged to carry a gun-ring (*Flight* Photo.)

aerobatics, gunnery, photography, bombing and, in fact, any other branch of military flying. Good use is made in the Show of the excellent system whereby the whole of the fuselage side can be removed as a panel; it enables all "the works" to be displayed to the best advantage.

On the German stand there is the Focke-Wulf "Stieglitz," a light two-seater biplane built mainly of welded steel tubing. Its inverted four-cylinder Argus A58 engine, of 135 h.p., is nicely cowled in, but there is no evidence of undue searching after a high performance. Rather is it a sound little machine specially designed for aerobatics and suitable for teaching the rudiments of flying.

In a somewhat heavier category is the Arado 69. This is what may be called a middle-weight biplane with staggered wings which are also heavily swept back. The tail units are unique in that the



The stand arranged by the Russian Soviet. In the foreground is a full-sized model of the balloon gondola used for stratosphere flights. Behind it is the ancient ski-plane used for the Chelyuskin expedition rescue. On the left is a pair of the huge double wheels of the *Maxim Gorky* undercarriage, a model of which may be seen above the emblematic hammer and sickle near the foreground. (*Flight* Photo.)

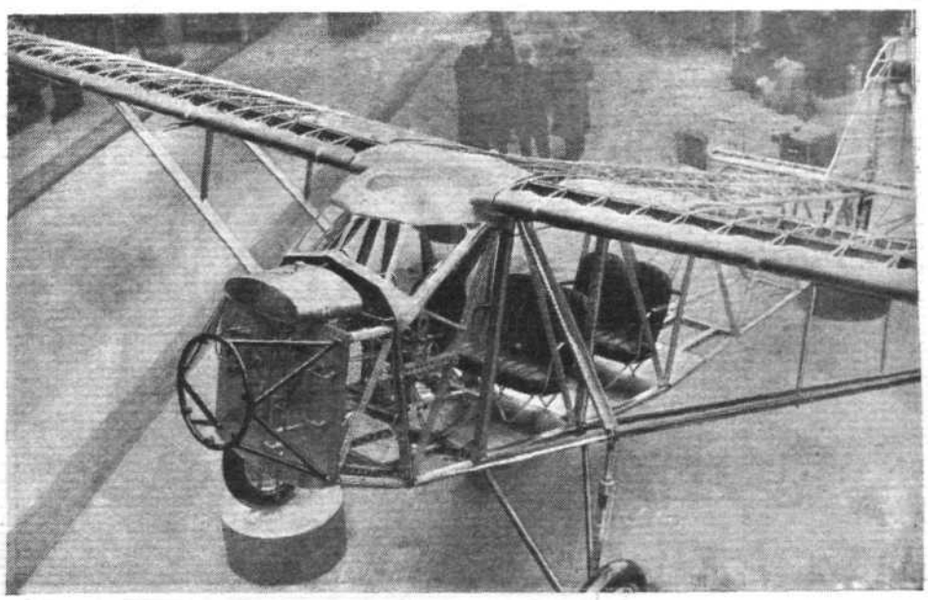
comparatively small rudder and fin are set forward of the tail plane and elevator and above them. The latter is therefore the aftermost portion of the machine and consists of an unsplit equi-surfaced unit having a comparatively narrow chord and large span, with a small centre "tab" for trimming purposes. With a Siemens Sh14a radial air-cooled engine of 150 h.p. it appears to be an admirable machine for advanced training.

The Bücker is rather similar to the Focke-Wulf, in that it is a small steel biplane with the neat four-cylinder inverted 80 h.p. Hirth engine of the type fitted to the Shackleton and Murray S.M.I. pusher which we have flown in England. The whole machine looked rather too light for the rough-and-tumble life of a training aeroplane but is probably intended for preliminary training in impecunious clubs.

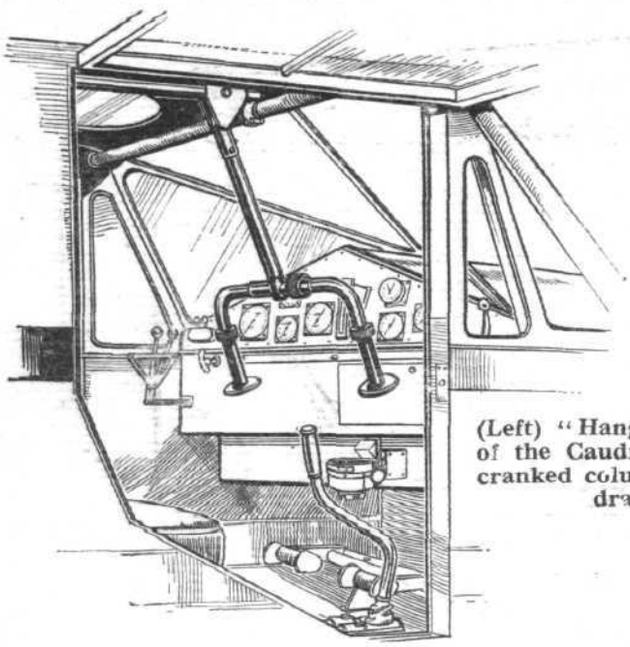
Fiats were showing a pleasant-looking little biplane known as the G8. A two seater, it is mainly constructed of metal with fabric covering and is fairly conventional in design. With a Fiat A54 radial engine of 135 h.p. the machine looks not unlike our Avro "Cadet."

One version of the Hanriot, more fully described elsewhere in the report, is so arranged that the rear cockpit is open and has a gun-ring in the top decking while allowing full room for wireless equipment behind the pilot. In this form the machine serves for light reconnaissance training, gunnery, wireless or photography.

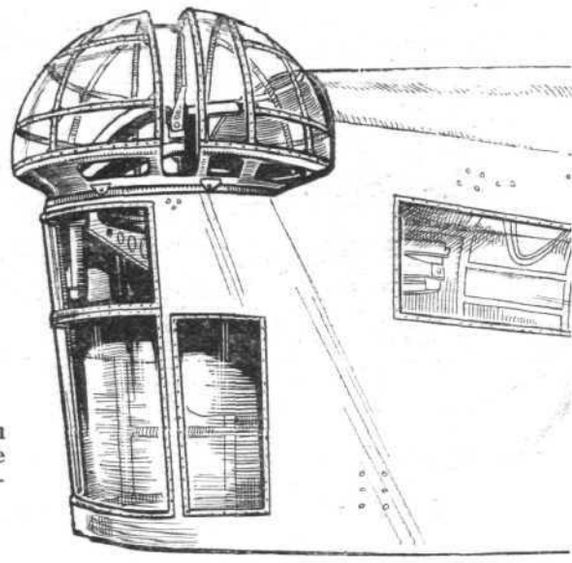
Two of the Morane machines are primarily designed for training: The 341, a light parasol monoplane with the Renault "Bengali" engine, and the 315, a heavier machine—a two-seater parasol monoplane with the 135 h.p. nine-cylinder radial Salmson engine. Both are of metal construction with fabric covering and the first has the aileron operating rods very neatly led up the wing bracing struts into the wing



A beautiful example of shot-welding on the Russian Stand: the "Stal 2," a four-passenger monoplane built of stainless steel (*Flight* Photo.)



(Left) "Hanging" control column of the Caudron "Phalene"; the cranked column operates the hydraulic brakes.



(Above) The re
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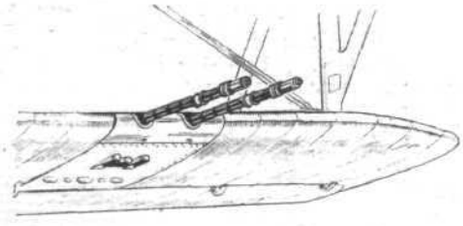
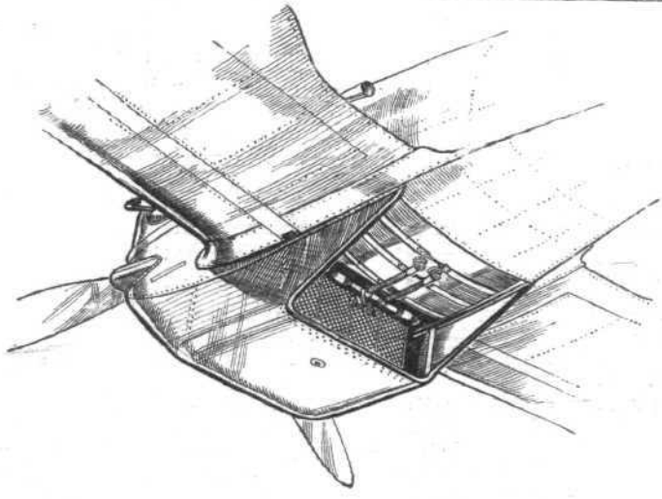


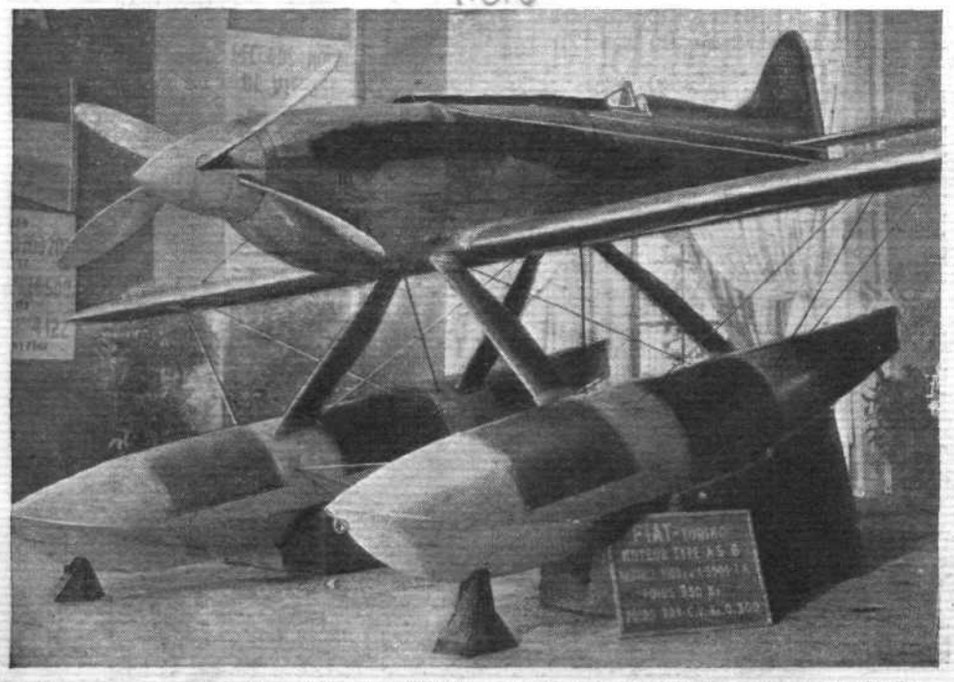
The Letov S.231 has a pair of machine guns in each bottom wing.



(Left) The e
radiator under
the fuselage o
all-metal Dew
511 fighter

Marine Aircraft

IT cannot be said that the seaplane class is fully represented at the Show, but there is quite a range of types, with the Macchi world's speed record machine at one end of the scale and the little twin-engined Savoia-Marchetti S.80 amphibian at the other. In between are such types as the Lioré et Olivier LeO H.24 four-engined flying boat, the large Junkers 52 twin-float seaplane, and an assortment of smaller types, civil and military.



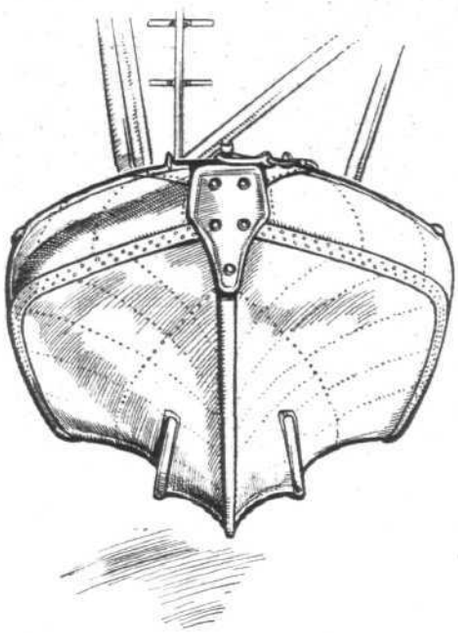
The record-breaking Macchi M.72, which is covered almost entirely with radiator surfaces.

Altogether there are in the exhibition, if one counts a not-so-new Levasseur torpedoplane and a somewhat freakish amphibian discreetly tucked away in a "back room," eight marine aircraft. In addition, some of the types exhibited as landplanes are capable of being transformed into twin-float seaplanes.

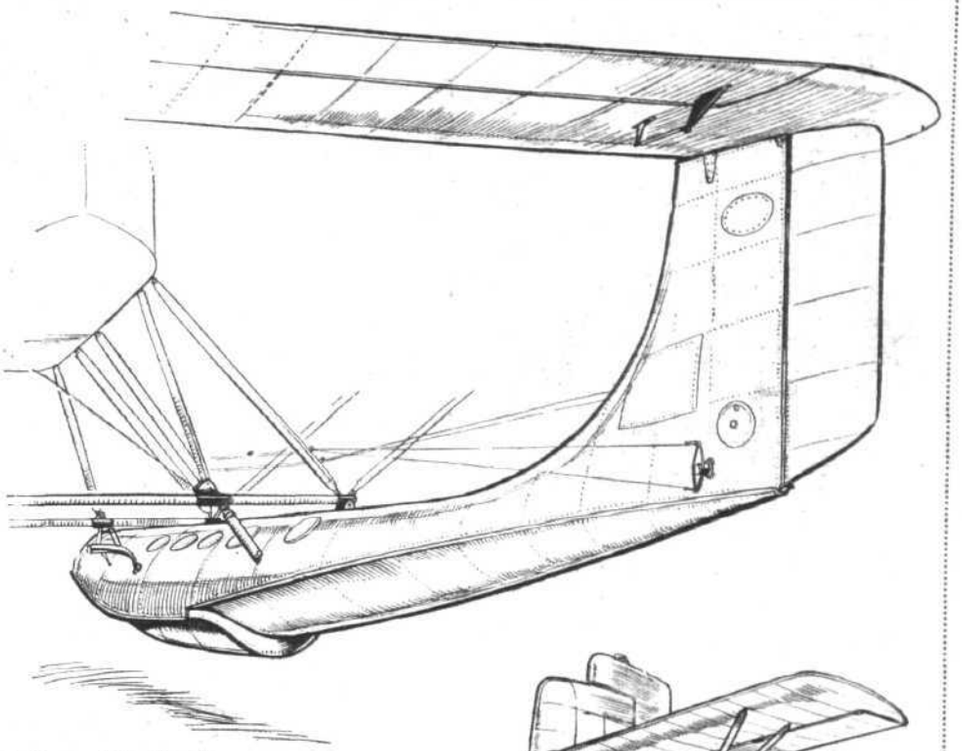
France's contribution to commercial marine aviation takes the form of the Lioré et Olivier LeO H.24. This is a four-engined flying boat designed for the Marseilles-Algiers route, and is a high-wing monoplane of "mixed" construction, with a metal hull and an all-wood cantilever wing.

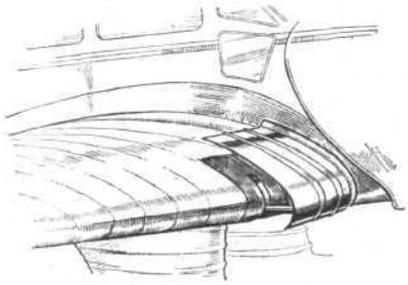
The four Gnome-Rhone engines, of the 7 Kd type and 350 h.p. each, are placed on trestles above the wings, in two tandem pairs. Lateral stability on the water is obtained by two outboard floats, each placed approximately half-way along the semi-span. The machine has a gross weight of 8 400 kg. (18,500 lb.), and is equipped to carry eleven passengers. The total pay-load, when the range is 600 miles, is 4,800 lb.

Two features make the Junkers Ju.52 particularly interesting. It is fitted with three of the Junkers "Jumo" 5 diesel engines, and has very unusual floats. It will be recollected that the Napier Company has secured the British rights for the Junkers "Jumo" 4 and "Jumo" 5 diesel engines, and that firm is actually exhibiting a "Jumo" 4 (known as the Napier "Culverin") on the stand facing the



Head-on view of one of the Junkers Ju.52 floats.

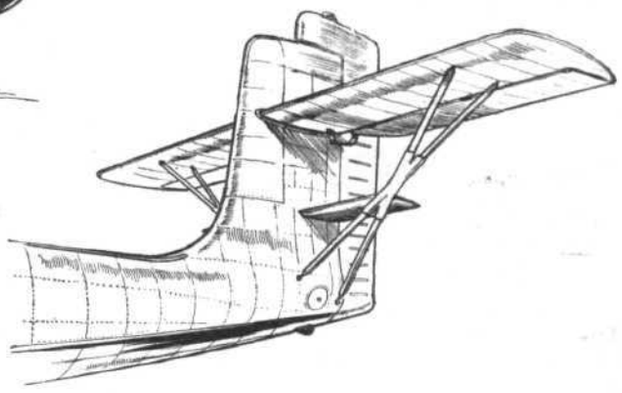




(Above) One of the floats which support the tail of the Levasseur P.L.200.

(Right) The tail units and unusual bracing of the Lioré et Olivier H.24.

(Left) This slot on the P.Z.L.26 smoothes the air flow over the tail at high angles of incidence.



Junkers three-engined float machine.

The Ju.52 has not yet been flown with the diesel engines as a seaplane, but the engines have been thoroughly tried out on landplanes. The aluminium alloy floats of the Ju.52 have fore-and-aft steps in addition to the normal transverse steps. The bottom, instead of having a normal vee form, is stepped so that a wide keel is formed. The object doubtless is to improve the shock-absorbing qualities for alighting. The idea is not new, as it was used, in a more primitive form, on French Nieuport seaplanes in 1912 or 1913.

The Macchi seaplane on which Agello established a world's speed record of 709·209 km.p.h. (440.7 m.p.h.), was naturally a great centre of attraction from the moment the Show opened. It was noted that the exhaust flames from the short stubs had blackened the sides of the fuselage for a considerable distance, and that metal plates had been screwed on the sides to prevent the wood from catching fire.

In the French Air Ministry section the most interesting seaplane exhibit is the tiny Bernard H.52 C.1. This is a single-seater seaplane fighter, powered by a 500 h.p. Gnome-Rhone 9 Krsd supercharged air-cooled engine The machine has been designed with a view to transforming it into a landplane fighter The speed claimed for it is 280 km.p.h. (174 m.p.h.) at ground level, and 320 km.p.h. (198 m.p.h·) at 13,000ft. The machine is of all-metal construction.

Another military seaplane of considerable interest is the new Levasseur P.L.200. This is a twin-float strut-braced monoplane with an abbreviated fuselage. The fins and rudders are carried on the sterns of the floats, and the tailplane rests on top of the fins. The object of the arrangement is to provide a good field of fire for the rear gunner, the slope of the stern of the nacelle being such that he can fire downwards at quite a steep angle, no fuselage intervening between him and the tail. There is certainly something to be said

The Junkers Ju.52 on floats; it has three Junkers "Jumo 5" diesel engines.

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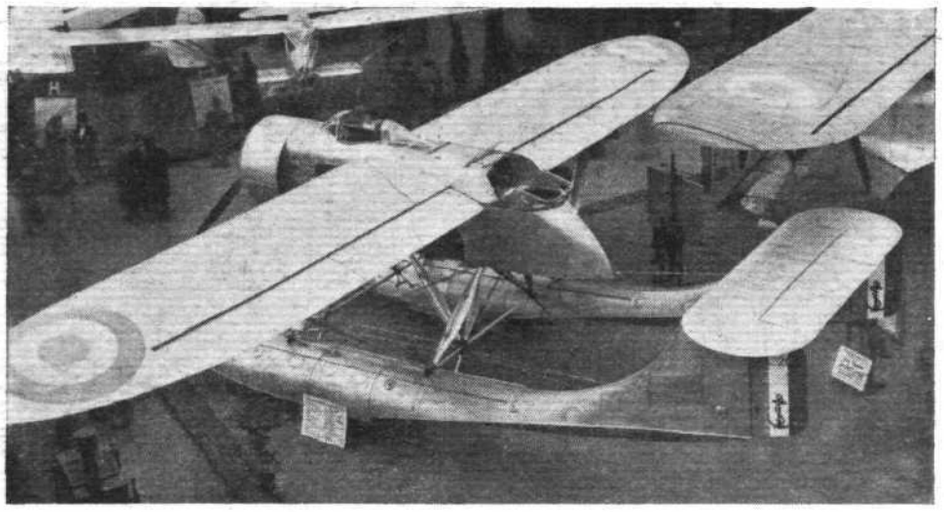
for this type of layout. The machine is a three-seater, the pilot sitting in front, the chief observer in the middle, and the rear gunner, who is also the wireless operator, at the back.

Struts are rather plentiful in this machine. A considerable number support the two floats, but it should be remembered that the P.L.200 is designed to be catapulted, and that the centres of the catapult attachments are fixed and invariable, whatever the design of the particular aircraft. This has rendered the task of supporting the floats a good deal more difficult. Placing the rudders far apart has resulted in removing them a considerable distance from the slipstream, and as no water rudders are fitted, at present at any rate, it is rather to be expected that the machine will not be too easy to handle on the water at low speeds. There should, however, be no great difficulty in fitting water rudders, when this objection would disappear.

A Savoia-Marchetti amphibian, with which readers of *Flight* are already familiar, is exhibited. This is the type built in the United States by the Budd Manufacturing Co. as an example of what can be done with the Budd shot-welding process. The machine visited England a year or so ago, and was demonstrated by Capt. Rex Stocken.

The little twin-engined Savoia-Marchetti S.80, is similar to the machine which took part in the Egyptian meeting about a year ago, but it has now been fitted with two British Pobjoy "R" engines of 75 h.p. each, mounted to drive pusher airscrews. The machine carries a pilot and three passengers, and, as it is an amphibian, one would expect the power loading to be somewhat heavy, and the take-off a little slow. Split trailing edge flaps are fitted. The cruising speed is given as 175 km.p.h. (108.5 m.p.h.).



A twin-float seaplane designed for catapult launching: The Pierre Levasseur P.L.200 with Hispano 9 Vbrs engine.

Fighting Aircraft

WHEN the Show opened, it became clear that the fighters on show were, as is often the case, the centres of interest; there is no doubt that even to the uninitiated there is great fascination in the idea of really high speeds.

Taking them as seen in a stroll round the Show, and not in any implied order of precedence, we come first to the Hawker "Fury." The Hawker stand adjoins that of the Bristol Aeroplane Co., and forms a small English colony separating, on one side at least, the German exhibits from the French—we hope with no political significance. The remainder of the British representatives, namely, Armstrong-Whitworth and A. V. Roe, are alongside the U.S.S.R. stand and might, perhaps, be considered as holding a watching brief over *that* nation!

The "Fury" should need no description to our readers, standing, as it does, supreme in its own particular sphere. As it is used in the R.A.F. no announcement is made of its performance, but we may safely assume that it is able to defy competition.

The Morane fighter, the M.S.275, ap-

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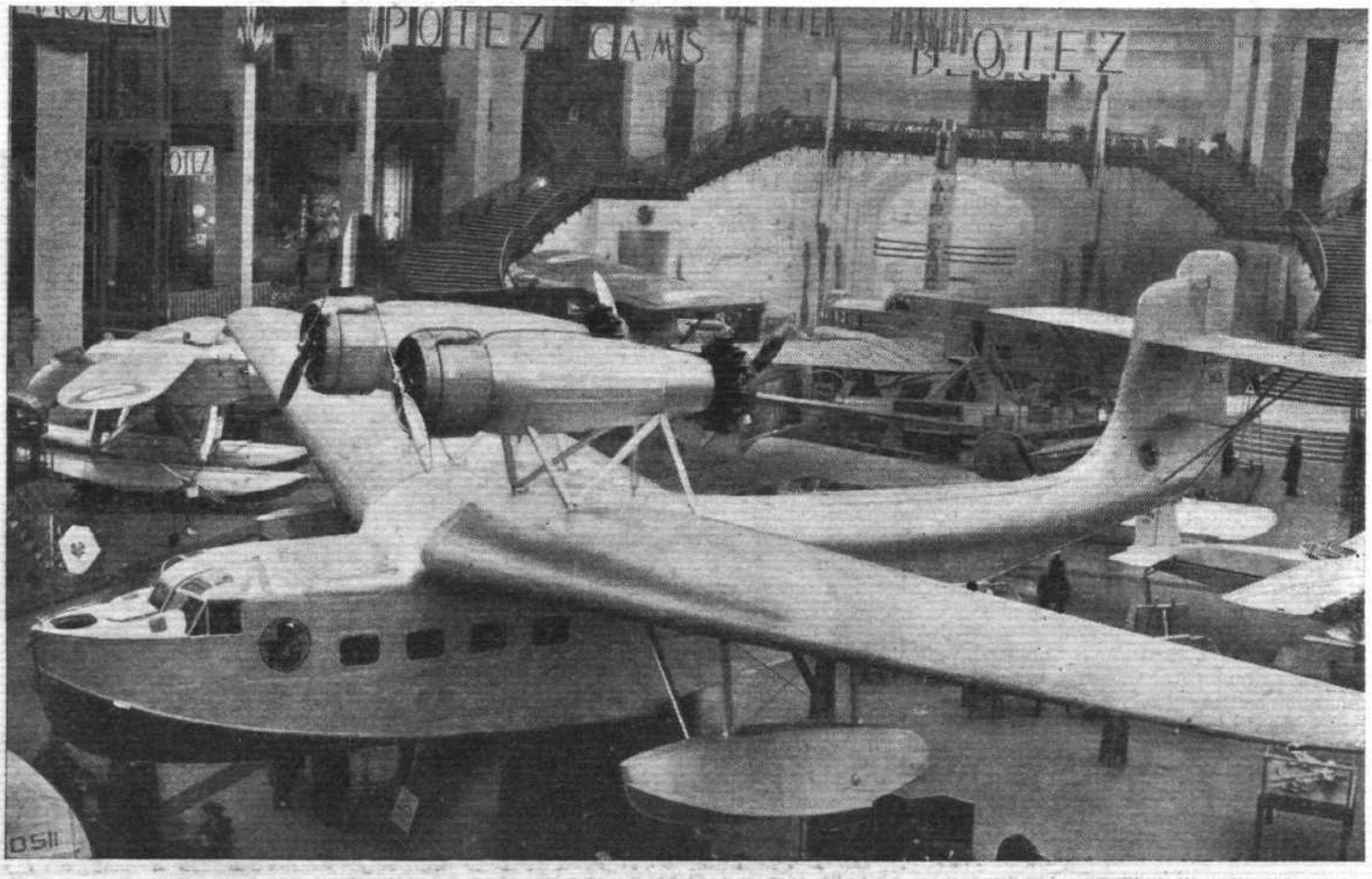


The only large flying boat in the Show—the Lioré et Olivier H.24-2 with four Gnome-Rhone 7 Kd. 350 h.p. engines. It will be used on the Algiers-Marseilles service.

pears somewhat large, although, in these days of new ideas on fuselage shape, a large fuselage does not necessarily denote a low performance. The engine, a Gnome-Rhone of 600 h.p., is of course, fully cowled, and the top speed was given as 363 km.p.h. (225 m.p.h.). In general the machine is an all-metal fabric-covered parasol monoplane with a widely spread undercarriage having the compression legs led up to outrigger points which serve as anchorages for the wing struts.

Two Polish fighters, the P.Z.L. 11C. and 24, are beautiful examples of modern aircraft construction; both have been described in our pages. The 24 is merely the latest form of the 11C. The high wing is gull-like in that the roots droop to the fuselage, allowing the pilot a view over them and forming, to a certain extent, a "valley" which accommodates two machine guns. Because the machine is a parasol monoplane, the fuselage is unencumbered by lower wing roots, and thus the pilot has an almost unrestricted outlook in all directions.

Both the fuselage and the wing are completely built up of light alloy as regards the structure and the covering. In addition to the two machine guns already mentioned, two large-calibre *canons* are mounted in the wings at the points where the wing struts meet the under surface, and the fairing around them merely serves the dual purpose of streamlining the strut ends and the guns. The 24 is probably the fastest machine, apart from the record-breaking Macchi seaplane, in the Salon; its top speed, with the Gnome-Rhone K.14, is 416 km.p.h. (257 m.p.h.).

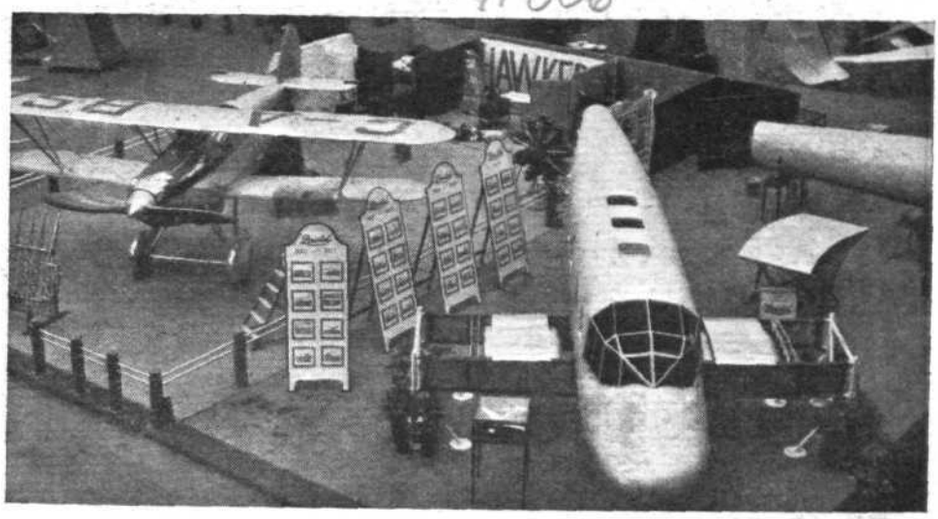
A *Fast Fighter*

The Letov S.231, although a biplane of more conventional form, is also very fast, as, with the Gnome-Rhone "Mistral Major" of 880 h.p., the top speed is 405 km.p.h. (251 m.p.h.). The armament consists of two pairs of large-calibre machine guns in each bottom wing outside the airscrew disc. The general construction is of welded steel tubes, and, on the whole, the machine appears both solid and strong. Each undercarriage wheel is carried on a single strut which is braced to the fuselage by three wires. These legs take the compression by an outwards movement against a shock-absorbing unit inside the fuselage. The wing bracing is by N-struts at the tips and streamline wires on the front spar only.

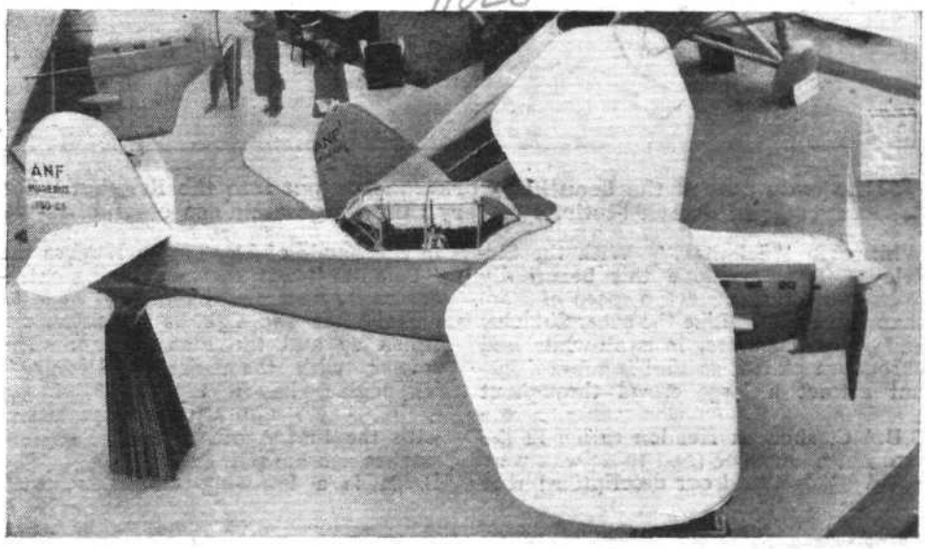
Another fighter at the Salon for which a speed of 405 km.p.h. (251 m.p.h.) is claimed is the Avia 534. This machine is a normal biplane with a water-cooled Hispano Ybrs engine and a "tummy" radiator. Dual streamline wire bracing is used for the single bay. The undercarriage is neat, consisting as it does of a single fully cantilever strut which merges into the spats over the wheels in a very clean manner.

Of composite construction, the front part of the fuselage has a covering of duralumin and aluminium over riveted and bolted steel tubes, while the rear part has a fabric covering over riveted and/or welded steel tubes. The wings are also of steel with fabric covering. The climb to 5,000 m. (16,400 ft.) takes 4 min. 24 sec.

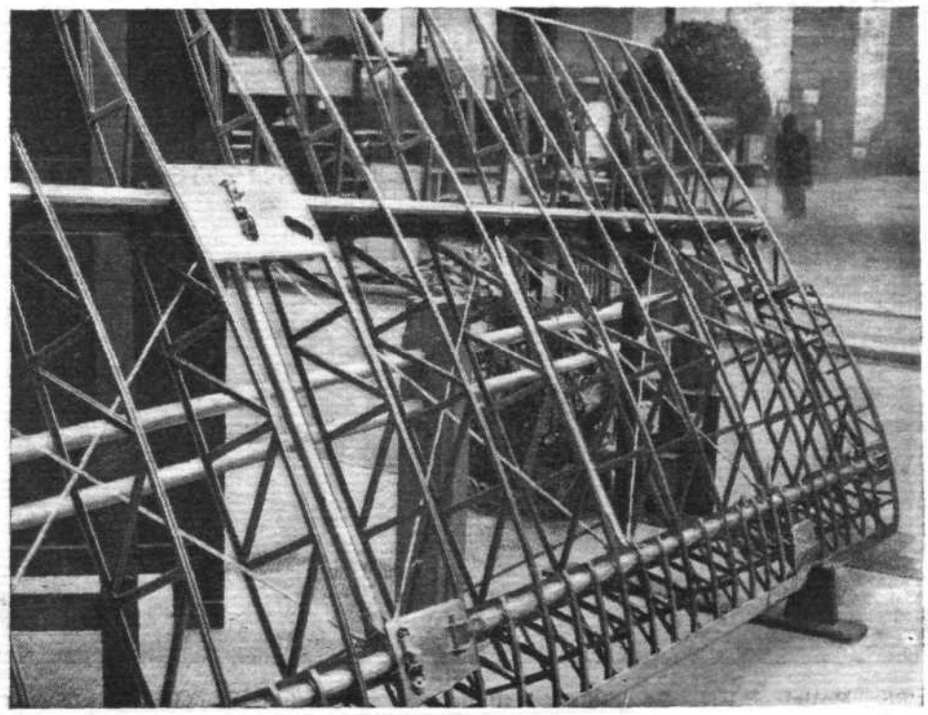
Britain's sole fighter exhibit with an air-cooled engine is the Armstrong



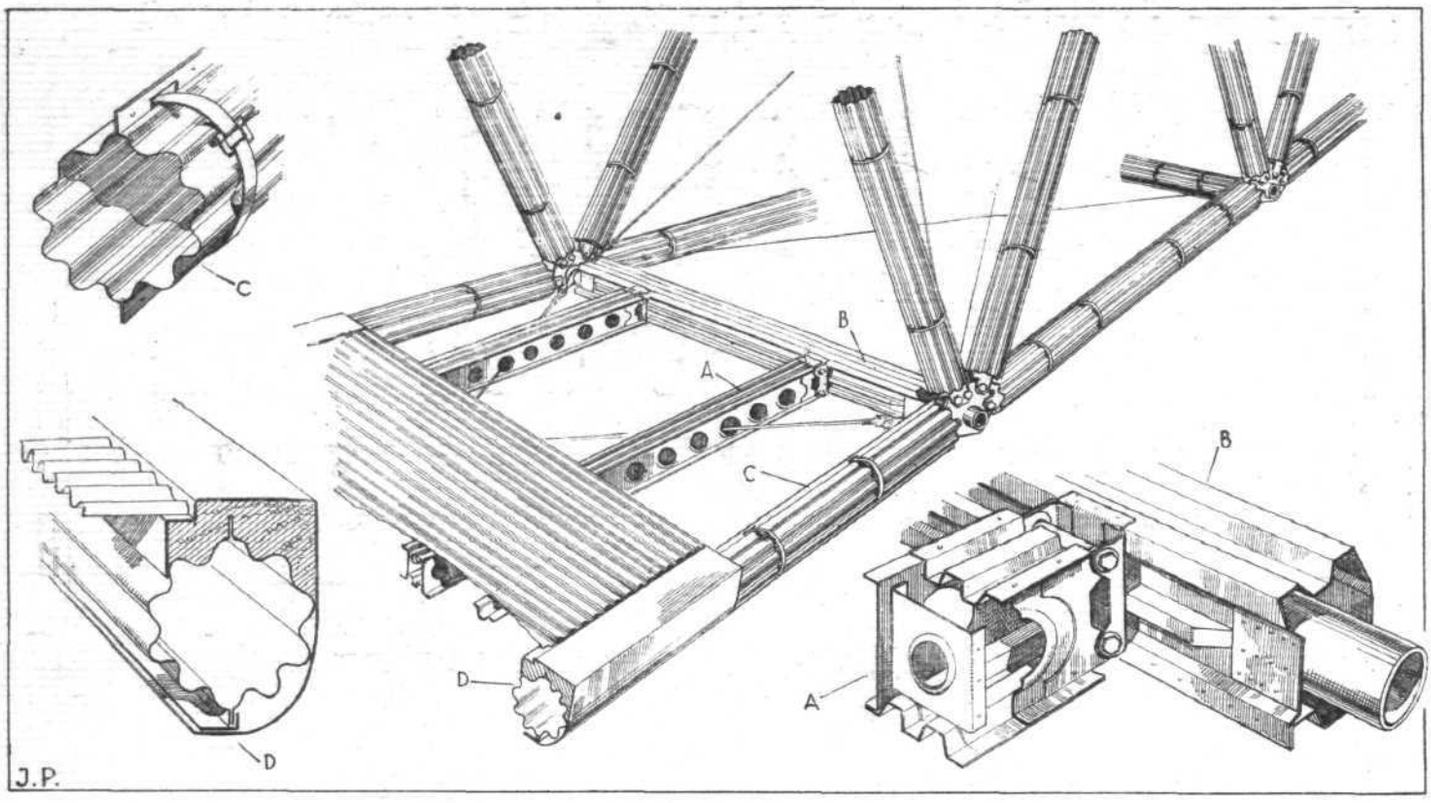
A British corner: the Hawker "Fury" is on the left, and the Bristol 143, interesting for its new form of construction, on the right.



The Mureaux 180 C2., an all-metal two-seater fighter with an unusual cockpit arrangement. The Hispano Xcrs engine has a nose radiator.



Stainless steel construction: a Hawker "Nimrod" wing.

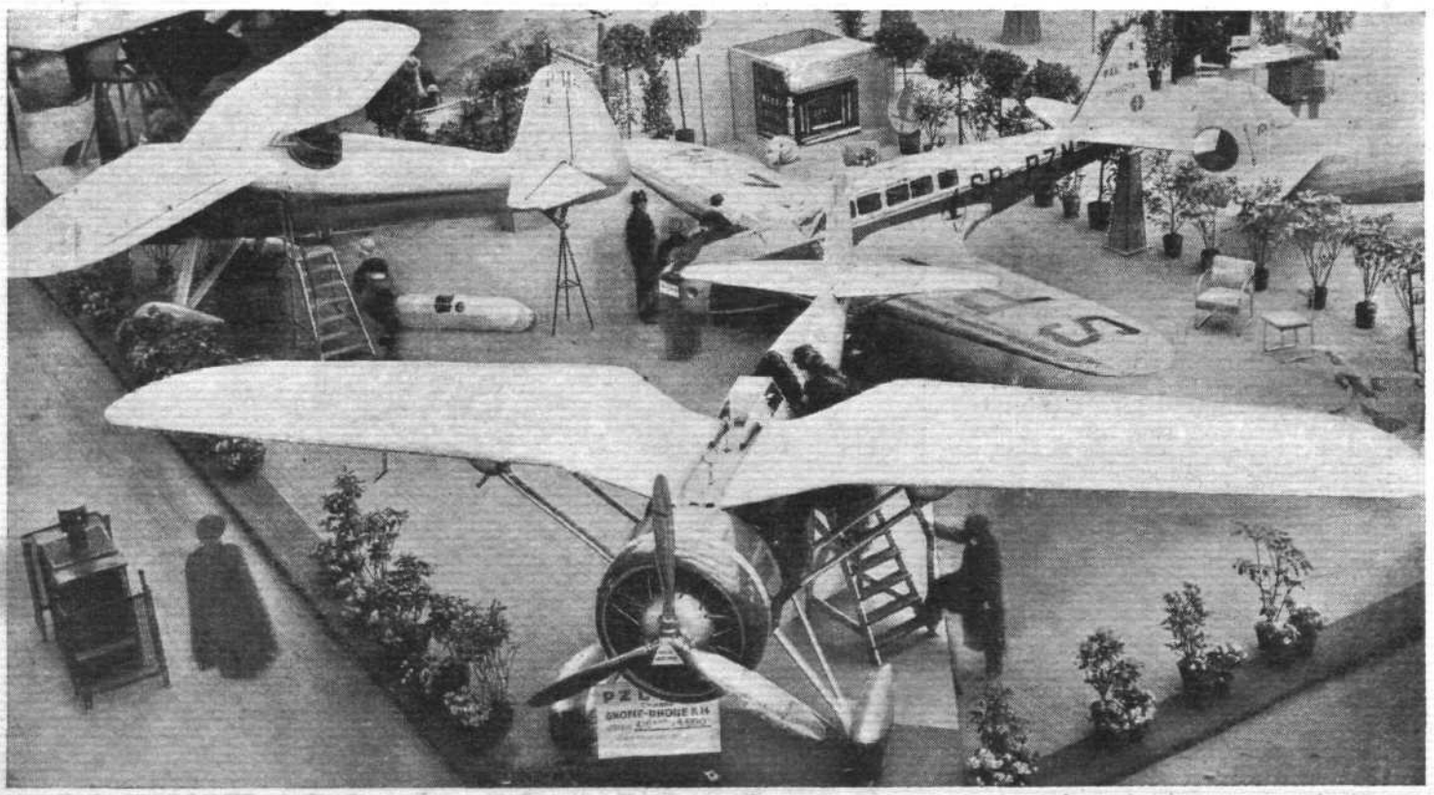


Some examples of the beautiful workmanship put into the Russian "Stal 2." The whole machine is built up of drawn sections of very thin gauge stainless steel, shot-welded on the Budd system.

Whitworth "Scimitar." With the Siddeley "Tiger" engine this beautifully finished aircraft has a top speed of more than 230 m.p.h. Like the other Siddeley and Avro machines, it is all-white and chromium plated, so that it cannot help but attract a large crowd throughout the show. Those who were at the S.B.A.C. show at Hendon earlier in the year will remember (and those who were not will have read our description) that in the hands of Mr. Turner Hughes the "Scimitar" was shown as being extraordinarily manœuvrable as well as fast.

Italy has two fighters on show, the Breda 27 and the Fiat CR 32. The former, with the Bristol "Mercury" VI engine, has a top speed of 340 km.p.h. (211 m.p.h.), and the latter, with the Fiat A30RA 600 h.p. engine, reaches 390 km.p.h. (242 m.p.h.). The Breda is a low-wing monoplane with metal fuselage and fabric-covered wing, while the Fiat is a two-seater biplane, fabric-covered throughout.

Another somewhat gull-winged machine is the Mureaux 180 C2. This monoplane is a two-seater fighter, and has its undercarriage spread out so that outrigger points are necessary to carry the compression legs. Over the whole of the cockpit, which seats two, is a large transparent "greenhouse," the rear por-



The Polish P.Z.L. 24, claimed to be one of the fastest Military aircraft in the Show, its Gnome-Rhone K.14 engine giving it a top speed of 257 m.p.h. On the left is the P.Z.L. 11C. an earlier version of the 24. Behind them is the P.Z.L. 26, specially built for competition in the Challenge de Tourisme. (*Flight* Photo.)

tion of which opens and forms protection for the rear gunner.

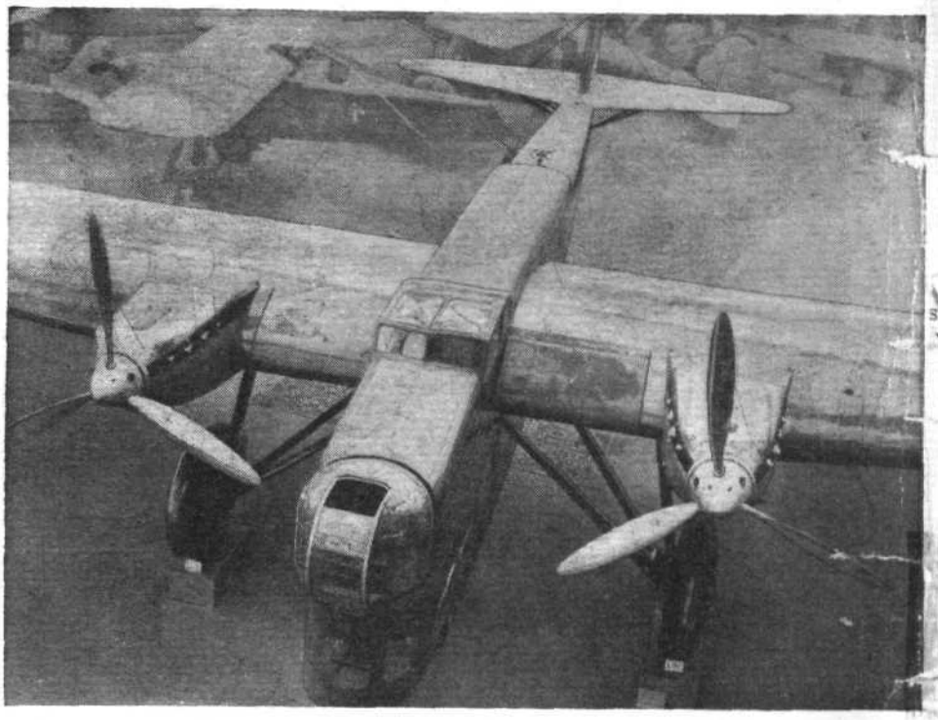
The entire machine is constructed of light alloy with covering of this material for both the fuselage and the wings. The engine is a Hispano XCrs. with a nose radiator shaped so as to conform more or less with the lines of the forward part of the fuselage. Performances are not given.

One of the most noteworthy fighters is the Dewoitine 511, a development of the type 500 shown on the French Air Force stand; it is noteworthy both because of its beautifully clean duralumin covering and because of its position—supported above the stand. The engine of this low-wing monoplane is the Hispano 860 h.p. water-cooled, and the performance claimed is well over 400 km.p.h. (248 m.p.h.). The wing is of a comparatively thin section, and the undercarriage has only a single strut, so really there is "nothing to stop it."

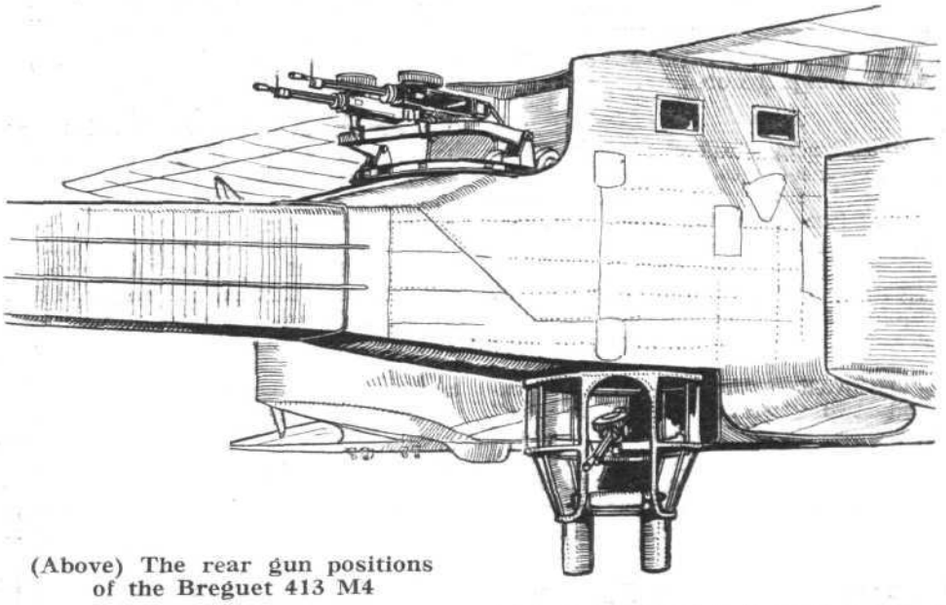
Heavy Military Types

ON the whole, military aviation is less strongly represented this year than in some of the previous Paris Aero Shows. Among the "heavy stuff," France is the only nation represented. This may have no other significance than that the cost of having a large night bomber, for example, transported to Paris is very much greater than the expense of sending a small single-seater fighter. What does appear significant is that the equal-span biplane appears to have been discarded by French designers, the monoplane having been adopted in its place, with a few "sesquiplanes" (biplanes in which the lower wing is very much smaller than the upper) still holding their own.

S.E.C.M. (Societe d'Emboutissage et de Constructions Mecaniques) exhibit an Amiot type 142 M multi-seater bomber and fighter. The prototype of this was known as the "140 M." The machine is fitted with two Hispano engines, and is actually a large General-Purpose type, as it can be used for fighting, day and night bombing, long-range reconnaissance, and artillery spotting. It is a cantilever monoplane of all-metal construction, with a rotating gun turret in the nose, and a "lower storey" which gives view for the bomber in front and for a rear gunner at the back, below the main fuselage. The wing area is 1,076 sq. ft., and the gross weight about 16,000lb.

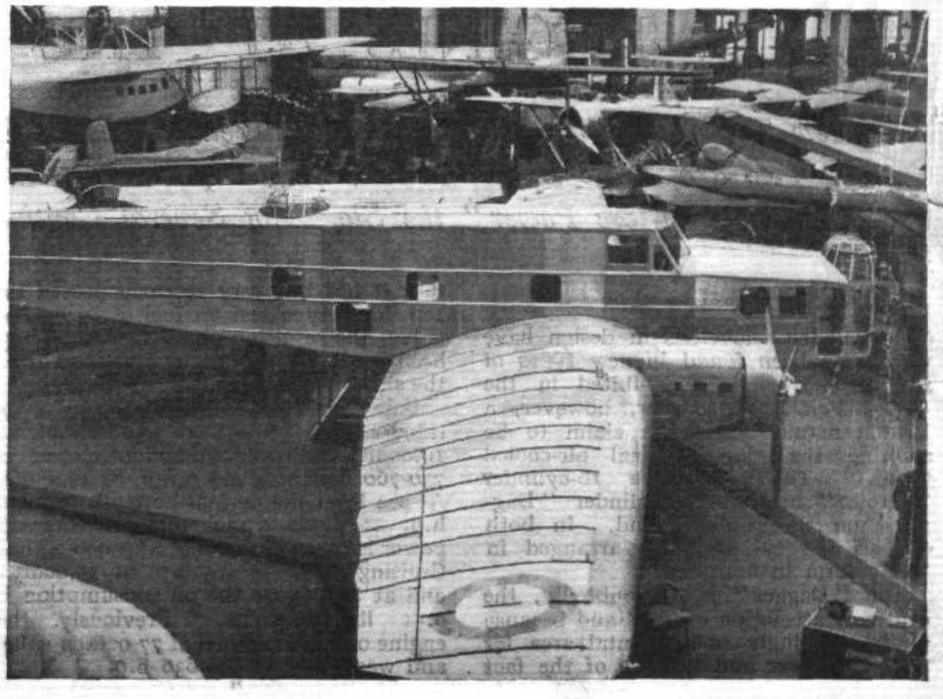


A view from above of the Amiot 142, one of the largest bombing machines in the Show. The engines can either be Hispanos as shown or, Gnome-Rhones as in the Amiot 143. (*Flight* Photo.)

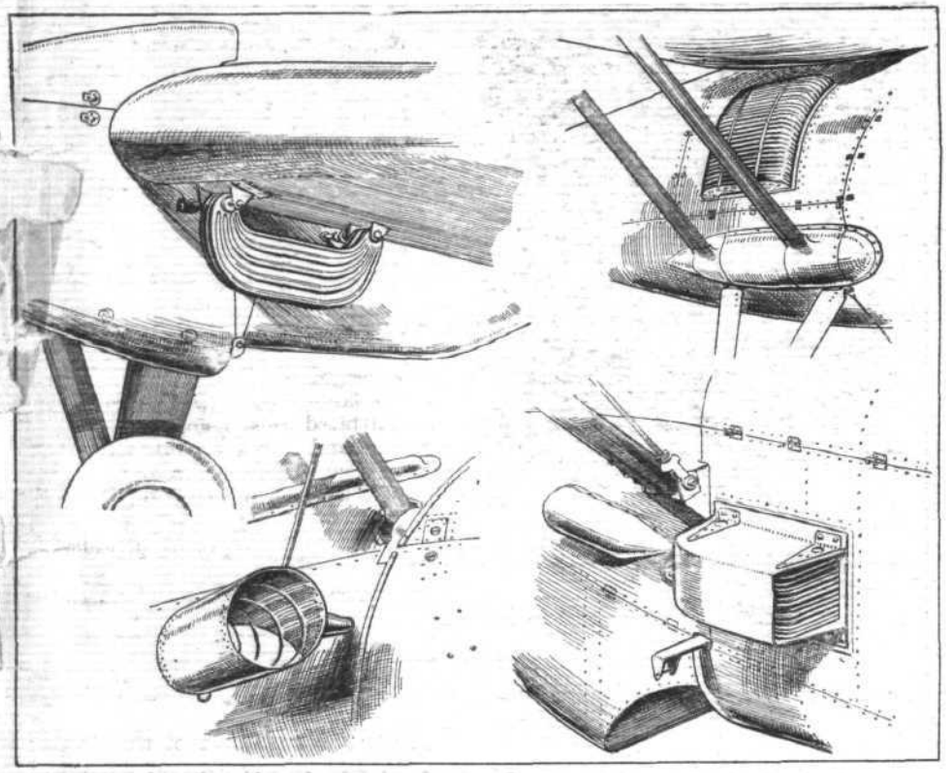


(Above) The rear gun positions of the Breguet 413 M4

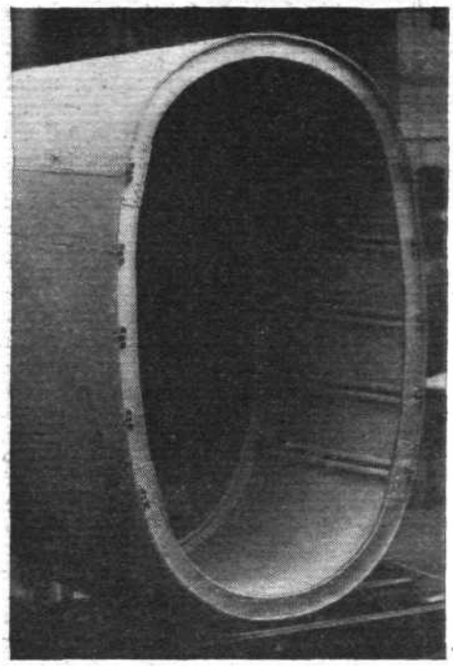
Marcel Bloch exhibits a night bomber, type 211 BN4. This is a low-wing cantilever monoplane of all-metal construction, with "stressed skin" ap-



(Right) The Bloch 211: One of the very large all-metal military aircraft with revolving gun turrets. In this case the engines are Hispanos. (*Flight* Photo.)



A selection of oil coolers: (top left) Farman 431; (top right) P.Z.L. 24; (bottom left) Focke-Wulfe; (bottom right) Potez 54.



A fuselage section on the Bristol stand, showing the company's latest method of all-metal monococque construction.
(*Flight* Photo.)

plied in flat panels. The usual revolving gun turret in the nose is found on this machine, as well as another protected gun position behind the wing and on top of the fuselage. The two engines are Hispano-Suizas, and nose radiators are fitted. Drag is reduced by using Messier retractable undercarriages. A top speed of 217 m.p.h. is claimed, and the range is given as 1,240 miles. The machine can be converted into a seaplane, and one large float is exhibited. On the French Air Ministry stand is the prototype of the Marcel Bloch, known as the type 200. This does not have retractable undercarriages.

Louis Breguet's type 41 M4 is another of the General-Purpose aircraft which France encourages. This machine, developed from the famous "Tout Acier," is a sesquiplane fitted with two Gnome-Rhone 14 Krsd. engines, while the 41 M3 has two Hispano 12 Ydrs. engines. The speed is given as 186 m.p.h., and the climb to 13,000ft. occupies nine minutes. The range is 750 miles.

The Ateliers Mureaux (A.N.F.) exhibit two "Grande Reconnaissance" machines, both strut-braced parasol monoplanes. The type 113 R2, with Hispano 12 Ybrs. engine, won the Bibesco Cup in July of this year by flying from Paris to Bucharest, a distance of 1,240 miles, at an average speed of 195 m.p.h. The later type, the 115 R2, has a Hispano 12 Ycrs engine, and, as in several of the new French machines, a nose radiator is used.

Yet another General-Purpose machine is shown by Henry Potez, the type 54. The general "formula" is similar to that of other French machines of the class, but the high wing is strut-braced from the engine mountings. With retractable undercarriages, the machine has a maximum speed at 13,000ft. of 200 m.p.h. at a gross weight of 12,300lb. The construction is "mixed."

These complete the machine exhibits at the Paris Show, which, incidentally, remains open until Sunday, December 2.

ENGINES AT THE SHOW

New Types Challenge the Supremacy of Well-established Engines Which, Until a Year or Two ago, Were Regarded as Daring Departures from Standard Practice: "Still More Power" the Slogan of Several Continental Designers.

Air-cooled Types

STARTLING novelties in design have rarely been found in new types of British aero engines exhibited in the Grand Palais. This year, however, a British manufacturer can claim to be showing the most original air-cooled types. These are the 16-cylinder "Rapier" and the 24-cylinder "Dagger" on the Napier stand. In both engines the cylinders are arranged in "H" form in four banks.

The "Dagger" is, undoubtedly, the centre of attraction of the stand because of its amazingly small frontal area for its high power and because of the fact that it has but very recently passed its 100 hours type test on fuel of 87 octane value, the resulting power figures having been made known for the first time after the show had started.

Using this leaded fuel, the engine is rated at 665-690 h.p. at 3,500 r.p.m. at 10,000ft., and the maximum power is 730-760 h.p. at 4,000 r.p.m. at 12,250ft. At sea level the normal power is 610-630 h.p. at 3,500 r.p.m. and the take-off power is given as 640 h.p. at 3,000 r.p.m. Cruising power is 475 h.p. at 15,000ft., and at this figure the oil consumption is 0.51 lb./b.h.p./hr. Previously the engine operated on fuel of 77 octane value and was rated at 610-630 h.p.

The "Rapier," which may now be regarded as a production-type engine, is available with or without supercharger. In its supercharged form the power is 305 h.p. at 10,000ft. and the normally aspirated version gives 340 h.p. at sea level. An example of the "Javelin" six-cylinder inverted air-cooled type of 160 h.p. is also shown.

Most interesting of the several Bristol types shown are the "Aquila" and "Perseus" sleeve-valve radials, although the new "Mercury" and "Pegasus" types designed to use leaded fuel are never without admirers. The sleeve-valve engines are not exhibited as finished products but to show the progress

made by the Bristol company in the construction of units of this type, and to emphasise the faith the company possesses in their future development.

The "Aquila" and "Perseus" engines are of 15.6 litres and 24.8 litres capacity respectively. It is claimed by the Bristol company that pressure cowling may be adapted with great facility to the sleeve-valve engine. On account of the clean and symmetrical external form, the cowling and baffles can be blended with it simply and efficiently. Hamilton two-position controllable pitch airscrews are standardised for both types. An oil control valve is incorporated in a housing spigoted to the reduction gear casing and is operated by an Arens cable controlled by the pilot. By means of this valve the oil pressure from the engine lubricating system is utilised to operate the adjustable-pitch mechanism.

Accessories on the rear cover of both types include new-type carburetter, with automatic altitude and boost controls, fuel pump, air compressor, hot and cold air intake, electrical generator and hand and/or electrically operated turning gear.

A "Mercury" VI S geared and supercharged radial of 605 h.p. is shown complete with the new combined cowling and exhaust collector ring. This engine is intended primarily for installation in high-speed fighters. A "Pegasus" is exhibited equipped to take the Hamilton C.P. airscrew and another engine of this type is sectioned to show the working parts.

There are no British radials with outputs as high as those of the Gnome-Rhone "Mistral Major" or the new Hispano and Renault two-row types, but the higher powered examples of the Bristol and Siddeley types are obviously popular on the continent for installation in military aircraft. The Letov fighter, for example, is available either with the "Mercury" VI, "Tiger" III or Gnome-Rhone K.14. We believe the most powerful radial mounted in a single seater in this country is the "Tiger," but Continental designers seem to crave sheer power and still more power.

The "Tiger" on the Siddeley stand is shown in section and is worthy of special mention because it has been adopted as a standard type by the British Air Ministry, though not for installation in single-seater fighters. This engine is available either as a fully supercharged or a geared fan type. The powers of the two versions are 610 and 650 h.p. respectively.

Also shown on the Siddeley stand are the 560 h.p. "Panther," 340 h.p. "Serval," 270 h.p. "Cheetah" V, 215 h.p. "Lynx," and the 140 h.p. seven-cylinder "Genet Major"—or "Civet" with new-type rocker boxes.

Continental Radials

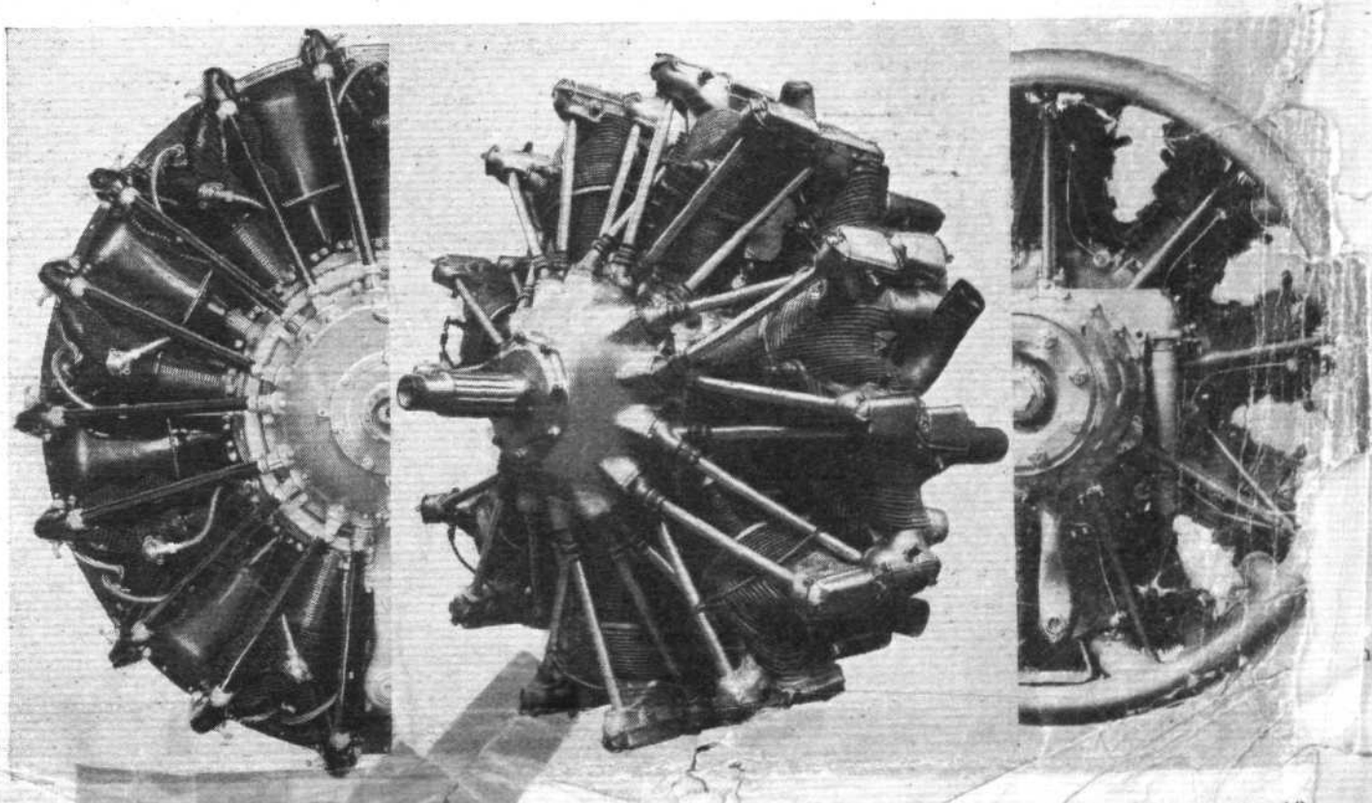
Incidentally, the two-row arrangement has taken a firm hold on the Continent for use in high-powered engines. The best-established engine of this type at present is undoubtedly the Gnome-Rhone "Mistral Major" or K.14. This engine, it is claimed, is the most powerful type to have been ordered and constructed in large series anywhere in the world. It is supplied as a direct-drive and fully supercharged engine for use in fighting aircraft, as a moderately supercharged and geared type for use in civil machines and seaplanes, or geared and fully supercharged for installation in larger military types. The "fighter" type engine weighs 1,144 lb. and is rated at 900 h.p.

One of these K.14 engines is shown on the Gnome-Rhone stand completely equipped with baffles and a portion of the low-drag cowling which has been standardised for the type. The "Mistral Major" is, of course, the largest member of the Gnome-Rhone "K" family, which includes also the "Mistral," "Titan Major," and "Titan" engines, all of which use the same cylinders, cylinder heads, and general components. The "Mistral" is in its geared form, which gives engine, at ground level. Also exhibi type "Titan Major," rated at 36 ction, and is shown in section, and the "T on the of 240 h.p. y the

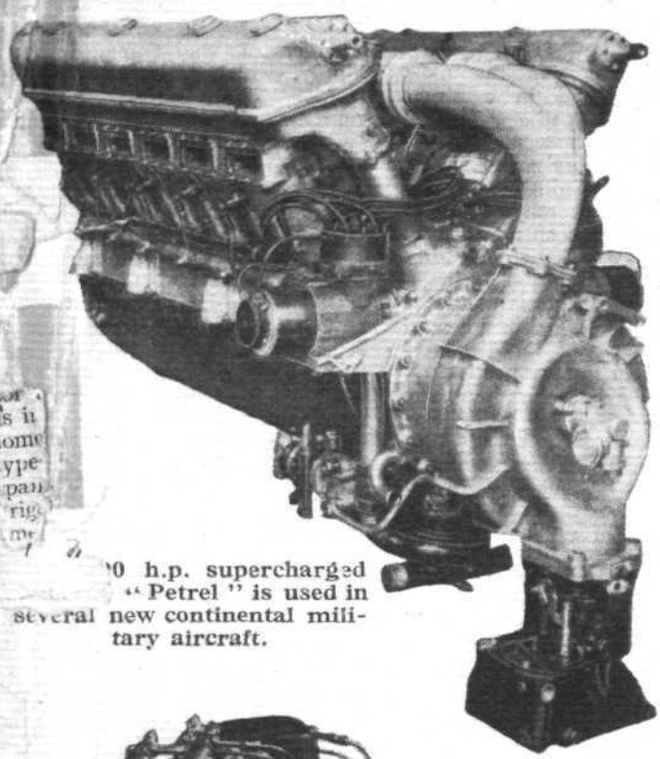
Of the Hispano-Suiza air-coo radials, the 14 Har is the most ..... It seems to be the Hispano ver... the American Wright two-row "Ve wind," and delivers a 1,000 h.p. for weight of 1,280 lb. Apparently it is i tended to compete with the Gnome Rhone K.14 and Renault 14 Fas type The geared and supercharged Hispan 9Vbrs also displayed is ... rig "Cyclone F," built under the li... existing between the W... periodic pano Companies, and g... features are understand that this ... nd pressure- ordered in series by Air France f... stallation in triple-engined trans... probably the new Dewoitines. A... Hispano radial is shown, this ... er- 9Qdr, rated at 350 h.p. and ... and 683 lb. ...ens ...dial

Historical interest is abundan... ...ed Hispano-Suiza stand, for a num... engines which have distinguished selves in some way are on exhil These include Guynemer's 180 h.p pano, and three engines which taken part in Atlantic flights.

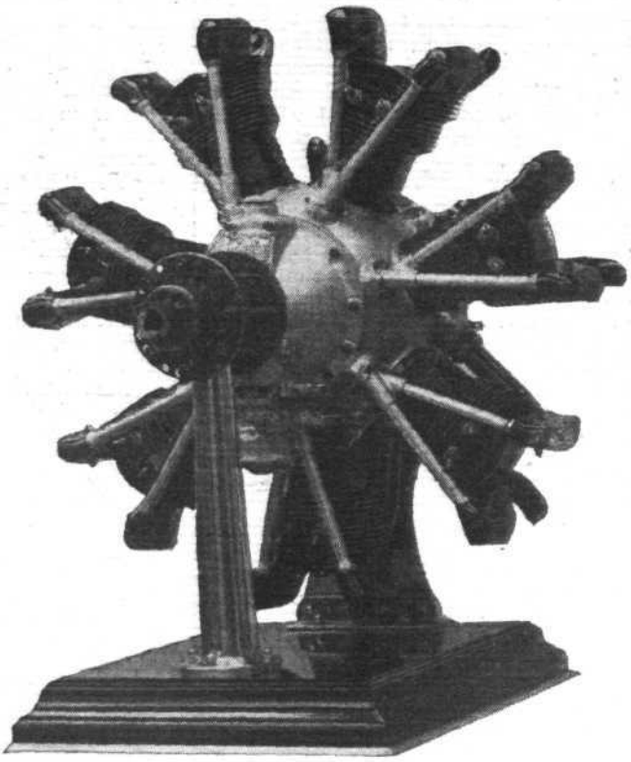
One gathers that the Renault C been spending very large sums o... on the development of its new a aero engines, and its stand s... examples ranging in power from 1,000 h.p. Smallest of these 140 h.p. "Bengali," which is



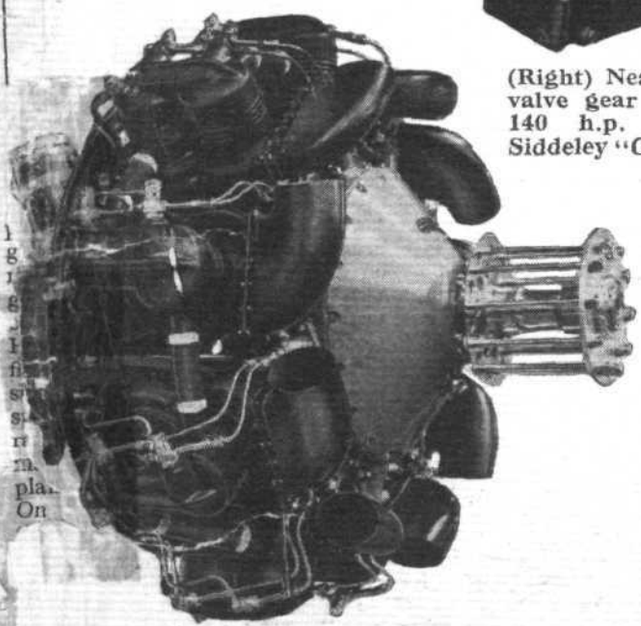
The 700 h.p. Pra... and Whitney "Hornet," the 900/1,000 h.p. Renault 14FAS (centre), and (right) the 60 Bristol "Mercury" VI S with its new cowling.



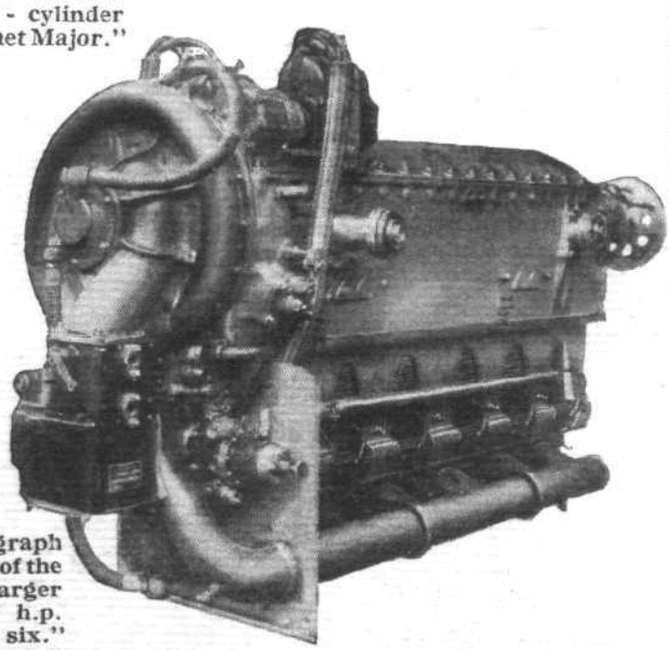
'0 h.p. supercharged "Petrel" is used in several new continental military aircraft.



(Right) Neatly enclosed valve gear on the new 140 h.p. 7-cylinder Siddeley "Genet Major."



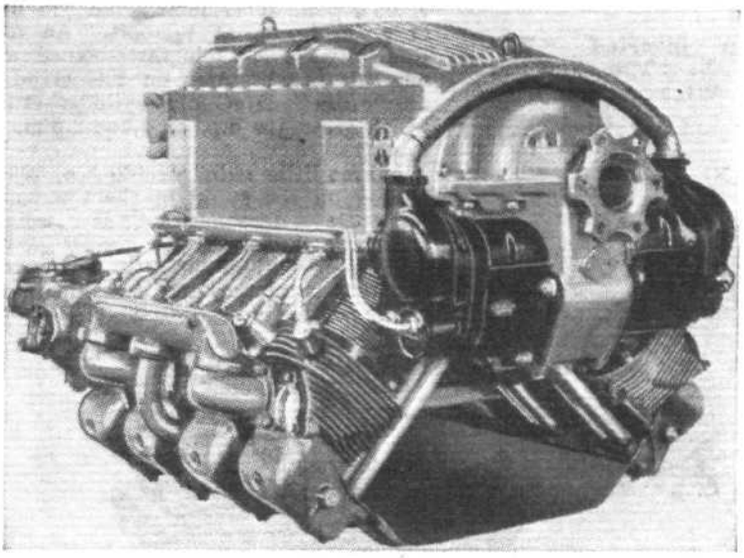
The interesting new Salmson Diesel, type SHI8, which gives 600 h.p.



(Right) This photograph shows the mounting of the centrifugal supercharger on the Renault 220 h.p. inverted air-cooled "six."

verted four-cylinder in-line type with a displacement of 6.33 litres and weighing, lete with pumps and starter, 319 lb. r "Bengali" is shown specially d for aerobatic flying. The supercharged Coupe Deutsch six- inverted engine is one of the eresting of the Renault exhibits, C a displacement of 7.95 litres maximum power of 325 h.p. at B9.m. It is equipped with a G centrifugal type supercharger. B dard inverted "sixes" are pro- sh by the company, both being t sed by clean design. One of ypes is equipped with a Renault arger, and can deliver its rated [illegible] at 6,560ft. or [illegible] cording to the degree of [illegible] ing, and the other type is naturally aspirated and rated at 180 h.p. Bore and stroke are 120 mm. and 140 mm. respectively, and the weight 462 lb. Also on the stand is a 350 h.p. nine-cylinder radial, the 9Ca, weighing 770 lb. equipped with a centrifugal type supercharger, and a larger engine of similar layout known as the 9Fas, rated at 600 h.p. at 1,950 r.p.m., and supercharged to deliver its rated power at 6,560ft. Largest of the Renault radials, however, is the fourteen-cylinder type 14Fas, with a bore of 154 mm. and stroke of 176 mm. The rated power is 900-1,000 h.p. at [illegible],000 r.p.m., and the maximum power at the rated altitude of 13,120ft. is 1,030 h.p. The engine is only 4ft. 2in. in diameter.

As usual the Salmson Co. is presenting a wide range of radials, comprising engines ranging from 75 to 500 h.p. In several of these the compression ratio has been raised, with a consequent increase in power output. For example, the 75 h.p. engine, known as the 9 Ae.R.S., is the former 45 h.p. type, and now employs a compression ratio of 5.6 to 1 and runs at 2,850 r.p.m. A Salmson centrifugal blower is fitted, and reduction gear is fitted. Dual ignition is also employed on this engine now, whereas the old type had but one magneto. The other types shown are typical Salmson radials, and include the 7 Ac (105 h.p.), 9 Nd (175 h.p.), 9 Aba (280 h.p.), 9 Nas (400 h.p.), and the 18 Abs (500 h.p.). This latter type is unusually interesting, in that its cylinders are arranged in pairs, one behind the other, and a mechanically controlled two-speed



A light German inverted air-cooled type: The Argus 10C of 200 h.p.

centrifugal supercharger is fitted. One of these speeds is employed from ground level up to 4,920ft., and the second is used above this altitude. The complete engine weighs 1,014 lb. Another novel Salmson engine, also shown, is the six-cylinder inverted in-line type of 180 h.p., known as the 6 TEA. Bore and stroke are 115 mm. and 128 mm. respectively, and the weight complete is about 440 lb.

Farman is showing two radials this year, the largest being the geared 9Ebr. of 220-265 h.p., with a bore of 115 mm. and a stroke of 135 mm. The displacement is 12.62 litres, compression ratio 5.2 to 1, and weight 583 lb. A direct-drive engine of 170 h.p. known as the 7 E.D. is the other type. Several examples of superchargers of the well-known Farman design are also displayed. These are built under licence by no fewer than twelve engine constructors.

Three low-powered radial engines, the 3B, 6B, and 9Ab, make up the Potez exhibit. These engines use several parts which are interchangeable between the three types. The 3B is a three-cylinder type rated at 60 h.p. and gives a maximum of 70 h.p., the 6B is rated at 120 h.p. and gives a maximum of 140 h.p., and the third engine, which, incidentally, equips the new Potez low-wing passenger machine, gives 185 h.p. at normal r.p.m. and 235 h.p. at maximum power. It may be remembered that a Potez nine-cylinder radial was fitted to the winning machine in the 1933 Coupe Deutsch Race.

Two five-cylinder, a seven- and a nine-cylinder radial are shown by the Lorraine Co. with normal ratings of 100 h.p., 120 h.p., 240 h.p., and 300 h.p. respectively. Both of the five-cylinder types have a stroke of 140 mm., but the second of the types obtains its greater power by an increase in bore. The seven-cylinder radial is known as the "Mizar," and has been ordered in large numbers by French and foreign Governments. It weighs 628 lb. Perhaps the best known of the Lorraine air-cooled types shown, however, is the "Algol," nine-cylinder radial, also adopted by the French Government and used on a number of long-distance flights.

The Regnier R.6 six-cylinder inverted air-cooled engine is the sole exhibit on the stand of its maker. It may be regarded as the French equivalent of our "Gipsy Six," and is rated at 180 h.p. at 2,300 r.p.m. The bore is 114 mm. and the stroke 130 mm., the compression ratio being 6.2 to 1. This engine is basically similar to the Regnier type developed for the 1933 Coupe Deutsch Race, but which was not ready in time to compete.

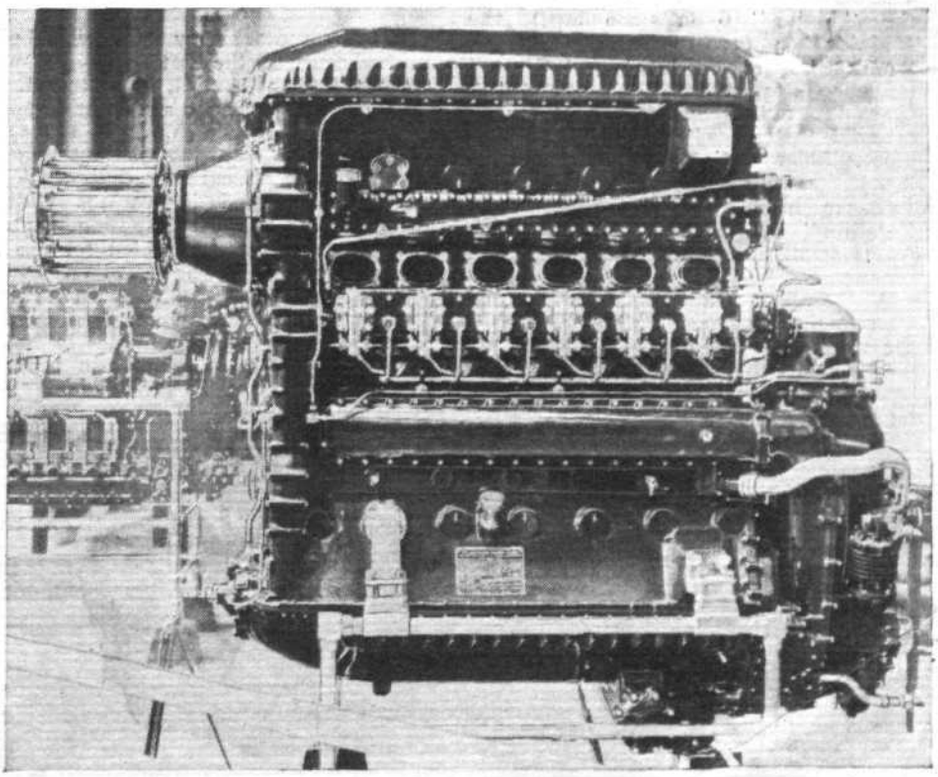
Examples of the latest versions of the ever-popular "Hornet," "Wasp" and "Wasp Junior" radials make an exceptionally attractive show at the only American stand at the Exhibition. This is the first time that the Pratt and Whitney Co. has shown at Paris. Considerable numbers of this company's engines, many of which are built under licence in Europe, have been in use on the Continent for several years past. The workmanship displayed deserves the highest praise.

Largest of the engines, the "Hornet" is one of the new series and is rated at 700 h.p. It is geared and supercharged, and its manufacturers claim that it has the lowest specific weight ever attained in a production type air-cooled radial. A normal power of 420 h.p. is given by the "Wasp Junior," which is as much as was given by the "Wasp" of a few years ago.

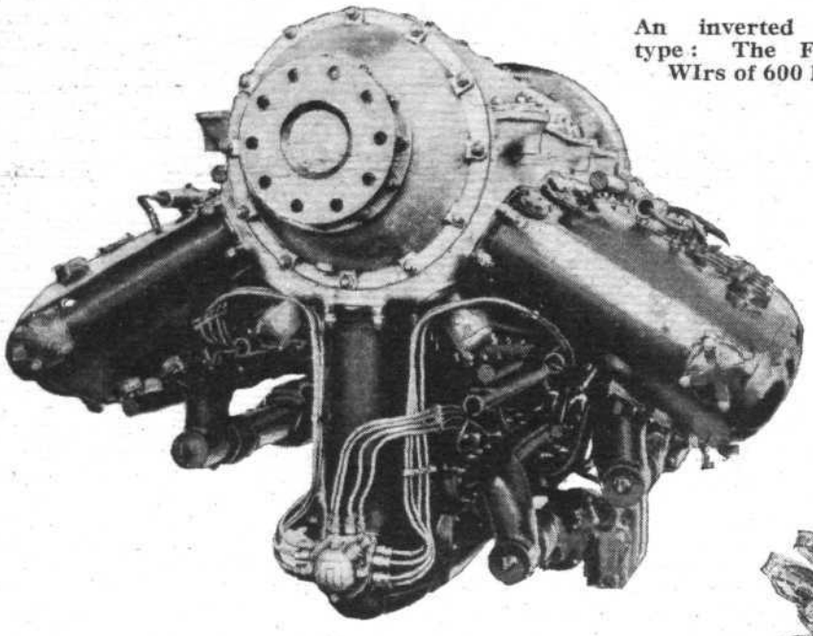
Perhaps the most attractive engine, however, is the latest "H" type "Wasp" which is shown in section, and which has but recently been put on the market. This type is rated by the manufacturers at 550 h.p. at 2,200 r.p.m. at 8,000ft. Using a controllable-pitch airscrew this power is also available at sea level. Fuel of 87 octane value is used. Several improvements over earlier models are embodied; for example, the engine has automatic valve lubrication, whereby valve tappets, ball ends of push rods, rocker bearings, and valves are all lubricated by engine oil under pressure, thus eliminating the use of rocker box grease and periodic manual servicing. Other features are the deeply finned cylinders and pressure-type baffles which make possible the cooling of the engine in a low-drag cowling.

On the stand of Deutsche Reichsverband there are the Seimens, Hirth and Argus air-cooled engines. The Seimens type is the SH. 14a 7-cylinder radial of 150 h.p., which is widely employed in German "touring" type aircraft. Bore and stroke are 108 mm. and 120 mm., and two alternative compression ratios are available. The weight is 275 lb.

There are two Hirth engines, the H.M. 60 R inverted four-cylinder type and the H.M. 8U inverted "V" type eight-cylinder. The H.M. 60R is developed from the better known H.M. 60 type, the main differences being an increase in bore, compression ratio and r.p.m. At 2,400 r.p.m. it gives 88 h.p. with a fuel consumption of 0.518lb. per b.h.p./hr. The inverted eight-cylinder type is of 8,000 c.c. capacity. Compression ratio is 6.5:1 and at 3,000 r.p.m. the engine develops 225 h.p. A reduction gear is fitted.



The imposing 720 h.p. "Culverin" compression-ignition engine on the Napier stand. (*Flight* Photo.)



An inverted "W" type: The Farman WIrs of 600 h.p.

Amongst the "Argus" types is the As.8B, inverted four-cylinder engine of 125 h.p., developed from an engine used successfully in the Challenge de Tourisme International, weighing 454 lb. Another "Argus" type, the As.10C inverted air-cooled "V," gives 200 h.p. at cruising r.p.m. and a maximum of 240 h.p. It is a neatly designed engine suitable for installation in three- or four-seater touring aircraft. The third "Argus" type is the As.17A, of 200 h.p., which has a bore of 120 mm. and a stroke of 130 mm. This is an inverted six-cylinder engine having an exceptionally well shaped crankcase which lends itself to the use of an efficient engine cowling.

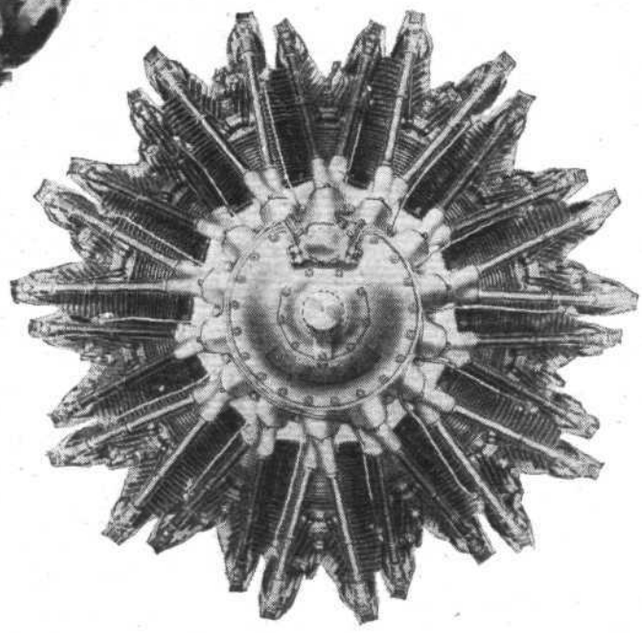
One of the widest range of engines in the Salon is to be found on the stand of the Walter Co. Three of the engines are inverted-in-line types, these being the "Major" 6 (185-200 h.p.), the "Major" 4 (120-130 h.p.), and the "Minor" 4 (75-85 h.p.). "Gipsy" influence is apparent. The other Walter types are radials and include the five-cylinder "Regulus" II (185-250 h.p.), nine-cylinder "Gemma" I (150-165 h.p.), seven-cylinder "Castor" II (260-340 h.p.), and the nine-cylinder "Pollux" III-R (420-550 h.p.), which seems small and neat for an engine of its power.

A "Stella" Xrc is shown by the Piaggio Co. Its most striking feature is the two-speed supercharger. At ground level, with the supercharged in first speed, the power of the engine is 650 h.p., and at 16,400ft., with supercharger in second speed, the engine delivers 600 h.p. Actually it is claimed that 700 h.p. is available for take-off. The weight is 970 lb.

A Pratt and Whitney "Hornet," built under licence by the Fiat Co., and known by them as the A.29R, is exhibited. It gives 700 h.p. at 2,150 r.p.m. at 6,560ft. The A.70S, of 200 h.p., is a seven-cylinder radial showing distinct American influence on cylinder design. This engine was fitted in various Italian machines for the last Rundflug. Inter-cylinder baffles are provided for use in long chord ring cowlings.

The Alfa Romeo Company is showing its 125 R.C. engine, which is a Bristol "Pegasus" built under licence in Italy. The example shown gives 650 h.p. at 2,200 r.p.m. at 11,480ft., and 710 h.p. at 2,530 r.p.m. at 14,100ft. An Alfa Romeo variable-pitch three-bladed airscrew is fitted. Also on this stand is the "Alfa" D/2C nine-cylinder radial which gives 310 h.p. at 2,200 r.p.m. at 8,100ft.

A neat little radial of 180 h.p. is exhibited on the stand of the Compania Nazionale Aeronautica. It weighs 275 lb, and delivers its normal power at 4,800 r.p.m. Four altitude records, two for seaplanes and two for landplanes, have been broken recently by machines fitted with this engine.



A 14-cylinder radial of 900 h.p. The Gnome-Rhone "Mistral Major" or K.14, which is being fitted in machines ranging from single-seater fighters to heavy bombers.

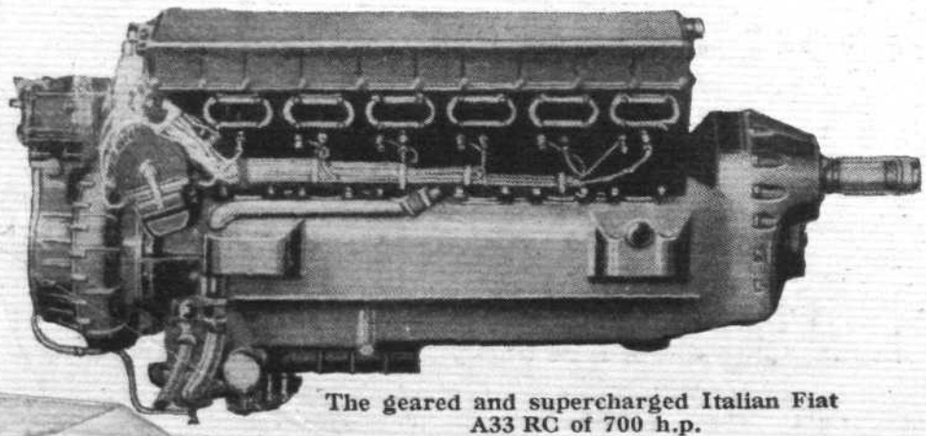
The stand of the U.R.S.S. contains a small seven-cylinder radial of conventional design known as the M.48 and rated at 200 h.p.

Water-cooled Engines

WHEN the Rolls-Royce "Kestrel" engine, or "F" type, as it was then known, appeared four or five years ago it created a considerable stir on the Continent. Ever since then it has been held in high esteem in Europe, and the latest version of this unit, the "Kestrel" VI, which is the main exhibit on the Rolls-Royce stand, is consequently proving a great attraction.

Continental visitors are specially interested in the composite cooling system developed for this engine. As explained in our description of the "Kestrel" last week, in this system radiator size is fixed by speed and power in level flight, and not on climb, and any steam formed during climb is condensed and led back into the water system. The engine maintains 600 h.p. at 11,000ft. on climb and gives a maximum power of 640 h.p. at 14,000ft. in level flight. It differs from the earlier type "Kestrel," a sectioned example of which is also shown on the Rolls-Royce stand, in that it has a strengthened reduction gear, an improved supercharger, and that it runs at higher speeds on fuel of 87 octane value. The weight is 975 lb.

One can usually rely on the Hispano-Suiza stand to display some of the most advanced liquid-cooled types in the



The geared and supercharged Italian Fiat A33 RC of 700 h.p.

Salon. This year, certainly, it is not disappointing. Examples are exhibited of the geared and supercharged "X" and "Y" engines with extraordinarily low power/weight ratios obtained through the use of light alloys and through the subtle detail design work of M. Birkigt.

Actually, the engines shown are the 12 Xbrs giving 690 h.p. at 14,750ft., and the 12 Ydrs which is normally rated at 860 h.p. at 13,120ft. They weigh but 814 lb. and 1,001 lb. respectively. One is impressed by the number of European aircraft, both military and civil, fitted with these excellent power plants. For sheer performance they possess numerous recommendations. Radiator size, however, appears to be something of a bugbear despite the use of ethyl-glycol. The two Mureaux machines fitted with "X" and "Y" type engines both use nose-type radiators, and the new Dewoitine single-seater fighter with a "Y" engine, as well as various other Continental machines using this power plant, employ abdominal radiators in a variety of shapes.

Popular Vee Types

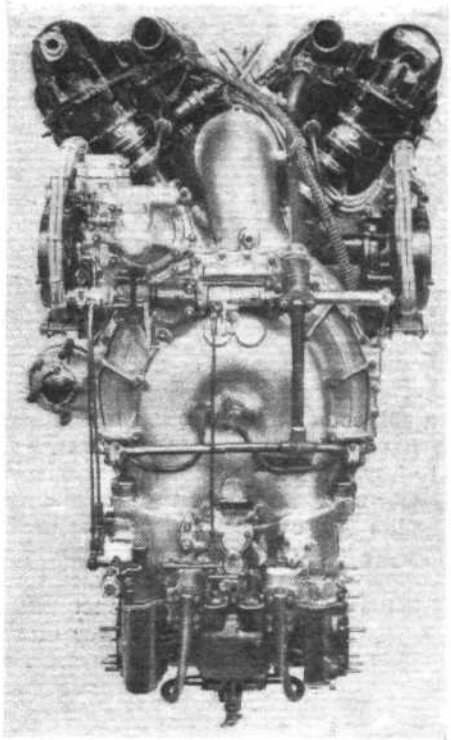
Perhaps the most notable features of these Hispano types are their nitrided cylinders, crank cases of special light alloy claimed to be practically incorrodible, and Elektron superchargers. These engines can be supplied to accommodate a *canon* which fires through the airscrew shaft, or with variable-pitch airscrew built by Hispano-Suiza under licence from the Hamilton Company.

High-powered liquid-cooled engines are, of course, a speciality of the Lorraine Co. Three examples are being shown, these being the 700 h.p. "Petrel," the 1,000 h.p. "Orion," and the 1,100 "Eider." The former engine has been adopted as a standard type by the French Government and by various air services, and can be supplied supercharged with or without reduction gear. Incidentally, the Japanese Government has bought the licence for this engine. It is a twelve-cylinder 60° V type with a bore and stroke of 145 mm. and a compression ratio of 6 : 1.

The fully supercharged "fighter"-type "Petrel" gives 775 h.p. at 2,800 r.p.m. and weighs, without accessories, 1,015 lb. In the "Orion" type the cylinders are arranged in "W" form, the bore being 125 mm. and stroke 180 mm. At its rated altitude of 4,920ft. the power is 1,050 h.p. at 2,150 r.p.m. In the 1,100 h.p. "Eider" the cylinders are arranged in Vee form and have a bore and stroke of 170 mm. At 11,480ft. the power is 1,050 h.p. at 2,400 r.p.m. This engine is being installed in several military prototype aircraft, and especially in "multiplace de combat" machines.

Compared with the number of exhibits by the Renault Co., there are few of its water-cooled products shown. One of these, the 12 Drs geared 12-cylinder "V" type, has a bore of 130 mm. and a stroke of 170 mm., and, although rated at 510 h.p., delivers a maximum power of 840 h.p. at 2,280 r.p.m. When supercharged, this engine delivers its rated power at 14,150ft. Besides this engine there are two 500 h.p. water-cooled "V" types, one geared and the other direct drive.

One of the most interesting water-cooled types in the Show is the Farman 600 h.p. 12-cylinder inverted "W" type 12 Wirs geared and supercharged engine. Its bore and stroke are 135 mm. and 140 mm. respectively. The supercharger of this engine maintains ground level power up to 22,960ft., and at ground level the maximum output is 710 h.p. We understand that this engine has also been fitted with a two-speed supercharger, the first stage of which ensures delivery of rated power up to 6,560ft., the second stage operating up to 16,700ft. Of equal interest is the Farman Crs 12-cylinder inverted 60° "V" type geared and supercharged engine giving 400 h.p. at 19,680ft. This is similar to the Farman developed for the 1933 Coupe Deutsch contest.



A view from the supercharger end of the Rolls-Royce "Kestrel" VI of 600 h.p.

A Record-Breaker

Fiat and Isotta Fraschini types represent Italian water-cooled engine construction. The Fiat A.33 is geared and supercharged and designed for use in military aircraft. It gives 700 h.p. at 2,600 r.p.m. at 11,480ft., and is a typical Fiat water-cooled type. One Fiat product, however, is attracting more admirers than any engine in the show, and no wonder, for it is the great "two-in-one" racing type engine as fitted to the Macchi seaplane which holds the world's speed record. Various rumours have been in circulation regarding the power of this engine, but according to the manufacturers it gives 2,900 h.p. at 3,300 r.p.m. and weighs 2,050 lb. As is by now generally known, this engine employs two groups of cylinders each with its own crankshaft, but employing a common crank case. The crankshafts rotate in opposite directions, and are coupled by spur gear reduction units which drive two airscrew shafts. One of these shafts operates within the other, which is made hollow for the purpose, and the two airscrews run close together in tandem, revolving in opposite directions, thus cancelling-out torque reaction.

Isotta Fraschini are showing the Asso 200, Asso Chasse, Asso 750 RC, and Asso X1 RC engines. The Asso Chasse is a "V" type 12-cylinder engine, and gives 480 h.p. at 2,550 r.p.m., but "W" arrangement is used for the cylinders of the 750 RC which delivers, at maximum r.p.m., 950 h.p. at 13,120ft. In the Asso X1 RC "V" arrangement is employed for the twelve cylinders. This engine gives a maximum of 850 h.p. at 14,700ft., and the same power is available for take-off. The weight is 1,212 lb.

One large Russian water-cooled engine is exhibited, this being the M.34 RN geared and supercharged type. It has its twelve cylinders arranged in "V" form and develops 750 h.p. at normal r.p.m. at 13,760ft. and 850 at maximum speed at the same altitude.

Compression-Ignition Engines

FEW new compression-ignition types are exhibited, and it would seem that, apart from Germany, these engines have met with no very great success on the Continent. Junkers type engines are exhibited on the stands of Deutsches Reichsverband, Compagnie Lilloise de Moteurs and Napier. These engines are of the "Jumo" 4 and 5 types. Napiers are showing the "Culverin," which is similar to the "Jumo" 4, and is rated at 720 h.p. It is generally known by now that this engine is a two-stroke type with two opposed pistons in each of its six vertical cylinders. Fuel is delivered to each cylinder by way of four nozzles by two injection pumps operated by camshafts running at engine speed. Without airscrew hub the engine weighs approximately 1,785 lb., which must be regarded as very creditable for a compression-ignition engine of this power. The Compagnie Lilloise builds a version of the "Jumo" 5 equipped with a Rateau two-speed centrifugal blower, giving 480 h.p. at 13,120ft. The engine weighs rather over 1,100 lb. Junkers are showing an example of the "Jumo" 5. It is understood that a "Jumo" engine has been flown by Luft Hansa over a period of several months, and has maintained a fuel consumption of between 160 and 170 grammes per h.p., a figure guaranteed by the manufacturers.

Most novel of the diesels shown, however, is the Salmson S.H.18, constructed under a Szydlowski licence. It is a water-cooled two-stroke radial, stated by the manufacturers to have nine cylinders, though actually it has eighteen, arranged in pairs in a fashion similar to those of the Salmson 8Abs air-cooled radial. Nine pumps supply the fuel—ordinary heavy oil—each pump feeding two injectors.

A high-speed centrifugal-type blower running at 13,500 r.p.m. is fitted, and, complete with accessories, the engine weighs 1,255 lb. At 1,600 r.p.m. the normal power is 600 h.p. Another interesting diesel radial exhibited is the Clerget, shown on the stand of the French Air Ministry. This engine gives 500 h.p., and it is a fourteen-cylinder double-row type known as the 14 F.25. It is said that the weight is in the region of 1,200 lb., and a large amount of development [illegible] negotiations [illegible] engine Zeppelin Company.

PRIVATE FLYING

A SECTION FOR OWNER-PILOTS AND CLUB MEMBERS

NOTES
by
LORD SEMPILL
A.F.C., F.R.Ae.S.

THE cost of flying one's own aircraft is a subject which is naturally interesting to those who have a desire to fly. Economic circumstances largely influence the rate of recruiting to the ranks of the owner-pilot, and the private owner who has not flown outside his own country may be equally interested in the comparative flying charges in other countries.

British motorists often hesitate to use their cars abroad for the reason that information of the essential costs is lacking. Another obstacle in the way of motoring on the Continent is the necessity for shipping the car by sea in the first instance. Although there is not the fuss and bother common before the expert advice and assistance of our motoring associations were available, this is still a considerable restriction.

The aircraft owner has a distinct advantage over the motorist where travelling abroad is concerned. He may be in Paris or Brussels before the car arrives at Dover or Folkestone. For tours of short duration, particularly, the aeroplane scores not only in convenience but in economy, for the average light aeroplane uses little more petrol than the medium-sized car. Both the motorist and the airman may obtain the advantage conferred by the issue of the appropriate Carnet de Passage, which eliminates the necessity for making large deposits against duty as a guarantee that the vehicle will not be sold in the countries being visited.

Continental Touring Charges

AIRCRAFT owners are better placed than car owners in this connection, as, to obtain his Carnet, the motorist must pay a deposit of £20 (which is refundable) and make arrangements to guarantee the high duty which would be payable in the ordinary way. The owner-pilot, up till recently, has been able to obtain his Carnet (which is, incidentally, available to members of the Royal Aero Club or of affiliated clubs with a special rebate of £1 1s.) without the payment of any additional deposit. Unfortunately, it has now been found necessary to fix a deposit of £10 (refundable) for an aircraft Carnet; but, even so, the pilot is in a better position than the motorist. The price of a Carnet for aircraft up to 1,000 lb. in weight is £2 6s., and for machines over this weight £2 12s. 6d.

The two other main sources of flying expenditure are landing fees and housing charges. The motorist may think himself lucky in having no comparable expense to the landing fee, but in the horse-power tax he pays the equivalent in a lump sum. With regard to housing, charges for accommodation of aeroplanes of the smaller sizes are hardly more than those for garaging the car. Landing fees must, of course, be charged, for aerodromes are expensive to acquire and to keep up.

For the information of owner-pilots it may be worth while [illegible] these two items of flying expenditure in the [illegible]ies I have recently visited. With regard [illegible] are invariably based on the area [illegible]ng fees, on the other hand, are variously assessed in accordance with the surface measurement, weight or horse-power of the aircraft. Recognised charges in this country, which are based on the weight of the machine, are from 2s. 6d. for an aeroplane weighing 1,200 lb. to 7s. for one weighing 3,000 lb. For the sake of comparison I will give the charges in France, Belgium, Holland, and Germany.

In France and Belgium landing fees are charged on the horse-power of the machine, being six centimes per h.p. in each case. For a light aircraft of 120 h.p. this would be about 1s. 6d. in Belgium and 2s. in France, and is, undoubtedly, a favourable basis of assessment. In Holland landing charges are based on surface area, being 0.50 florin (or 1s. 5d.) for each fifty square metres used. Weight is the basis in Germany, the charge being R.M.3 up to 1,200 kg. (2,640 lb.) for first-class aerodromes, and R.M.2.20 for second-class aerodromes. Aircraft fitted with tail wheels have an advantage on German aerodromes, as 20 per cent. extra is charged where the razor type of skid is fitted.

Extra fees are, of course, charged for night landings. In France and Belgium the charge is doubled. In Holland the fee for night landing is rather heavy, being 5 florins in addition to the ordinary fee, and the same on departure. In Germany the extra charge is R.M.6, plus the cost of lighting current and a charge for service. In each country a reduction is made for a number of landings, and usually no charge is made for a normal test flight.

With regard to housing charges, compared with the basic cost in this country, which varies from 2s. 6d. per night for 300 sq. ft. to 8s. for 1,000 sq. ft., those in France, Belgium, Holland, and Germany are as follows: Charges in Belgium for a night are 8 centimes per sq. metre, and, where the height of the aircraft exceeds 4.65 metres, the cost is 15 centimes per sq. metre. In France the basis is 5 francs up to 50 sq. metres, and 8 francs from 50-75 sq. metres. The charge in Holland is one florin per night for every 50 sq. metres. That in Germany, as in other countries, varies with the class of facility provided, the basis for first-class accommodation being R.M.3.60 per 60 sq. metres (590 sq. ft.).

Currency Facilities in Germany

IT will be seen that the Continental charges mentioned compare favourably with those in this country. When comparing costs in Germany, travellers by air should not forget the special currency facilities available in the form of "registered marks." This is an arrangement whereby travelling expenses may be paid for at a more advantageous rate than that of the normal exchange. To secure this advantage the tourist should obtain the special travellers' cheques issued under this system before leaving this country. These are obtainable from any bank or tourist agency, and are issued at fluctuating rates which are often 50 per cent. better than the [illegible]nary exchange, e.g., the special rate compared with the present normal quotation

THE LONG-RANGE FLYING BOAT

Its Development and Characteristics : A Précis of a Lecture Delivered by Igor Sikorsky

LECTURING before the Royal Aeronautical Society last Thursday, Mr. Igor Sikorsky, the designer of the S.42, explained at the outset how it had become obvious to him that the logical step needed to open up large areas for air transportation was an aeroplane capable of operating from land or water. He showed, however, that such a machine was very difficult to design, as compared with the normal seaplane or landplane.

The amphibian must take care of the extra weight and parasitic resistance resultant upon the attempt to combine the characteristics of both the landplane and the seaplane. It was, therefore, necessary to make use not only of highly efficient engines but also of equally efficient wings and control surfaces, so that a wide margin of increased performance would be obtained in order to compensate for the extra weight and resistance of the amphibian itself.

By combining the requirements of Pan American Airways and those of people wishing to explore the hitherto inaccessible regions of Central and South America and Africa, the S.38 Sikorsky amphibian was evolved. The increasing business of P.A.A., however, outgrew the capacity of their S.38s, and the three "Clipper" (S.40) boats were the outcome of their requests. From the very first the S.40 was a success, and, while it seemed to be a logical jump from the S.38, the Sikorsky staff had already started research with a view to developing a flying boat which would permit an even greater range and higher cruising speed than the S.40. It was when the first "Flying Clipper" made its cruise from Miami to Colombia that Mr. Sikorsky, in conference with Col. Charles A. Lindbergh, technical adviser to Pan American Airways, laid down the requirements for the new type.

The Evolution of the S.42

In the evolution of this, the S.42, as it was to be known, two factors which helped to a great extent were the production of the new Pratt and Whitney 700 h.p. geared "Hornet" engines and of the Hamilton controllable pitch airscrew. The design work on this boat, which took into account everything like cost and operation maintenance, durability, and passenger comfort, was spread over another two years, and the rigid weight control resulted in the useful load of the finished boat being as high as 48 per cent. of the gross weight.

In the S.42 the external outrigger type of bracing was not used, but the tail units were attached directly to the hull, while the one-piece wing, with heavily tapered tips, was also mounted directly on the top of the hull by means of a superstructure.

Mr. Sikorsky, having got thus far, then went on with a very detailed description of this boat and its construction, but as these have already been given in *Flight*, it is unnecessary to repeat them here. It is as well, however, to recall one or two figures which show the great increase in efficiency achieved in the S.42 as compared with the S.40. The older machine, for example, with a gross weight of 34,000 lb. and fuel for 1,000 miles range, had a payload of only 3,200 lb., while the S.42, under the same conditions, has a payload of 8,363 lb. Cruising speed at 1,000 ft. was 115 m.p.h. for the S.40, and is 157 m.p.h. for the S.42; and, as one would expect, the wing loading has increased from 19.5 lb. to 28.58 lb. per sq. ft. In this connection, however, it should be noted that the landing speed has, by means of flaps, been kept down to the same figure as that of the earlier boat, namely, 65 m.p.h.

From an economical point of view, a comparison between the two is equally favourable to the S.42. Using the same h.p., with a fuel consumption per hour, for the S.42, of 144 galls., and for the S.40 of 140 galls., the S.40 does 0.82 miles per gallon and 1.35 ton-miles per gallon. The S.42, however, does 1.0 miles per gallon, and has the greatly increased figure of 4.25 ton-miles per gallon. If the basis taken is that of ton-miles per flying hour, as is usual in the consideration of maintenance and operating costs, then the figures for the S.40 and S.42 are 169.75 and 616.25 ton-miles per hour respectively.

Advantages of High Wing-loading

Referring to the parasitic resistance, Mr. Sikorsky said that the total resistance under this head of the S.42 flying at 160 m.p.h. is only 3,620 lb. He explained that much consideration had been given to the cantilever wing, but it was felt that the resistance would be increased, owing to the greater thickness of the centre section of the wing, and also that the structural weight of the cantilever wing would be greater. Another reason put forward for having a machine with a high wing loading was that good airworthiness in stormy weather was considered essential, as the boat was designed for high cruising speed and operation over long trans-oceanic routes, and it was evident that vertical air gusts become more violent in their effect as the wing loading decreases. This contention was more than proved in flight trials in very rough weather. The disadvantages of the heavy wing loading were overcome by the specially designed wing flap, which produces an increase in lift of about 40 per cent.

Mr. Sikorsky feels that the lessons learnt from building this boat allow him to say with certainty that very much larger boats, weighing hundreds of tons, are not only possible, but practical, and he is confident that flying boats weighing 100,000 lb. or more, capable of non-stop ocean flights, and cruising at between 150 to 200 m.p.h., can be designed and be ready for service within two and a half to three years. He does not feel the size of the earth warrants greater speed than this, but air transportation will benefit more if designers give more attention to increasing passenger comfort and to ways and means of lowering transportation costs, rather than to obtaining higher operational cruising speeds.

Turning for a moment, in conclusion, to the question of altitude of flight, Mr. Sikorsky thought that the increase in structural weight, which would be necessitated by building an airtight cabin, if flights in the stratosphere were considered, would probably limit the flying altitude of the commercial air liner to something between 12,000 and 20,000 ft.

Britain's Municipal Aerodromes

Twenty-two towns now have licensed aerodromes, and eight have, in addition, purchased sites. When the number of towns which have merely "displayed interest in aerodromes" is considered, this is not a very brilliant total, but the few are to be congratulated. It is not reasonable to suppose that any out by [illegible] will normally pay for itself during the next few made quite clear [illegible] authorities should see the necessity for structural defect[illegible]uture.

[illegible]ns where things have been definitely moving recently and sites have been inspected are York, Perth and Grimsby. Further developments will be keenly watched.

A Japanese Airship Service?

According to *Asahi*, the Japanese Government has decided that a joint Japan-Manchukuo company shall be established in order to operate services between Tokyo and Singapore and the South Sea Islands, and between Japan and the U.S. The company is to purchase three rigid airships, and negotiations have already [illegible] with the Zeppelin Company.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

The Flying Cabinet

A 14-seater air-liner has been bought by the Austrian Government to transport members of the Austrian Cabinet when they visit foreign countries.

Across Pacific in Formation

A squadron of U.S. Navy amphibians will, it is reported, shortly undertake a formation flight across the Pacific from San Francisco to the Philippines, *via* Hawaii and Guam.

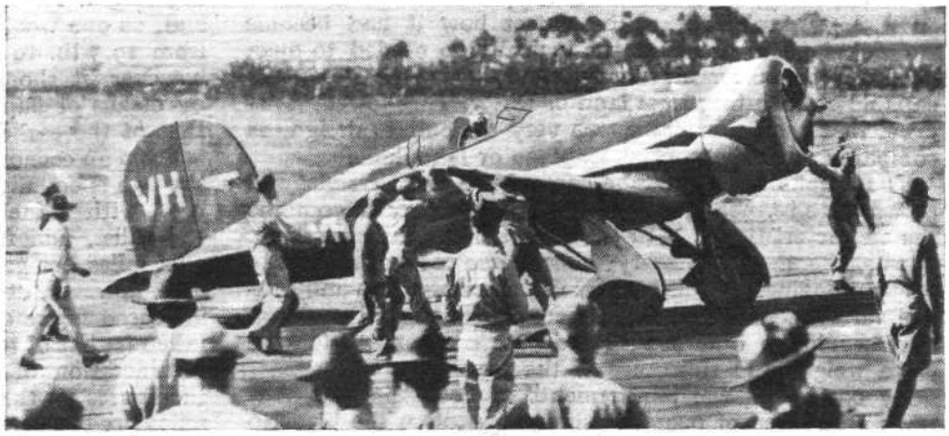
New U.S. Airships

Proposals have been placed before the aviation commission by Mr. Vinson for the construction of two large airships to replace the *Akron* and *Los Angeles*, and for a new type of cruiser with a "flying deck."

Twenty-five Years Ago

From "Flight" of November 20, 1909.

"In the course of a paper by Mr. H. Inigo Triggs, read before the Royal Institute of British Architects on Monday night, on the "Planning and Laying Out of Public Places," the author said that in view of the rapid strides which were being made in aviation, the necessity for trial grounds and alighting places would soon make itself felt. He hoped that he might not be considered too visionary in suggesting that the day might not be far distant when, perhaps, Hyde Park itself would furnish the site for a new form of place, the aviation place, with gigantic sheds able to accommodate a fleet of dirigibles."



AT HAWAII: Sir Charles Kingsford-Smith's Lockheed "Altair," *Lady Southern Cross*, arrives at Wheeler Field, Hawaii, after its flight from Suva, Fiji.

Australia-New Zealand Flight

Messrs. J. D. Hewett and C. E. Kay, who finished ninth in the England-Australia air race, flew in their D.H. "Dragon" from Sydney across the Tasman Sea to Palmerston, North Island, New Zealand, in 12½ hours on November 14. On landing the machine was slightly damaged by a collision with a fence.

Death of Gyroscope Expert

The death occurred at Glasgow last week of Prof. James Gordon Gray, who was responsible for many inventions relating to aerial and marine navigation—especially as regards the gyroscope. Amongst the most important of these inventions were the inductor compass, gyroscopic helms and stabilisers, the artificial horizon and the cloud levelling apparatus.

The Byrd Expedition

Admiral Byrd, leader of the American Antarctic Expedition, and four others of the party, have flown over 100 miles towards the South Pole from Little America, and have, it is reported, made important geographical discoveries.

After Australia—South Africa?

Proposals have been put forward in Cape Town for a big air race next year between England and South Africa to celebrate the 25th anniversary of the King's accession and the 25th anniversary of the Union. The race would be on the lines of the McRobertson England-Australia race, and the Mayor of Cape Town has sent a cable to Sir Abe Bailey suggesting that he should be the sponsor of the race.

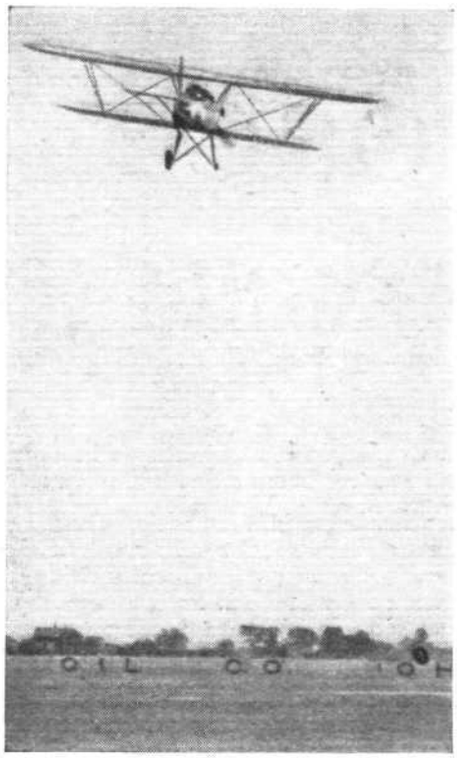
Publicity!

Interesting experiments were carried out at Hanworth during three nights of last week by Messrs. Addinsell, Batson and Speller. Mr. Addinsell was flying a Bristol Fighter, fitted with a banner 110 feet in length, hanging vertically, and the experiments were in the nature of illuminating the banner by a searchlight fitted on the aircraft. These experiments so far have been very successful, and at night time the letters on the banner can clearly be seen.

Lisbon-Timor Flight

Lt. Humberto da Cruz, of the Portuguese Air Force, flying his new D.H. "Leopard Moth" ("Gipsy Major"), with Sen. Carlos Bleck (De Havilland agent in Portugal), left Amadora, Lisbon, on October 25 on his flight to Timor (Portuguese E. Indies)—to which reference has already been made in *Flight*. Gaza was reached three days later, and on November 2 he arrived at Akyab, and at Bangkok next day, having then completed 8,500 miles in ten days, through indifferent weather. November 4 he set out for Ak[illegible]st was forced down at [illegible]en are often and eventually reached [illegible]uge, e.g., the ber 7. He is now flyin[illegible]al quotation

OFF TO THE ANTARCTIC: The Northrop machine, *Polar Star*, which will be used by the Lincoln Ellsw[illegible] Expedition for flights over the South Pole, being shipped at Dunedin e[illegible]te for Deception Island.



A DETRACTABLE UNDERCARRIAGE: Mr. Mils Burcham, the American aerobatic pilot, looses a wheel from his Bird biplane while stunting at the recent National Air Races, Cleveland. Note the wheel bouncing on the ground. Burcham made a perfect dead-stick landing on one wheel.

French Aircraft for Turkey

A report from Paris states that the Turkish Government is negotiating with French aeroplane manufacturers for the purchase of forty machines, bombers and fighters, for the Turkish Air Force.

A Madagascar Flight

M. Christian Moench, President of the Aero Club de l'Est, recently completed a flight from France to Madagascar in seven days. Accompanied by M. Jean Latinot, he left Marseilles in a D.H. "Leopard Moth" ("Gipsy Major") on October 24, and reached Antananarivo on October 30.

"Graf Zeppelin" Statistics

When the *Graf Zeppelin* completed its eleventh, and final (scheduled) round trip between Germany and South America on November 6, it had covered a grand total of very nearly 1,000,000 km. (620,000 miles), in a flying time of just on 9,635 hours, during which 27,368 passengers have been carried. The *Graf Zeppelin* was constructed in 1928.

A Rocket Mail Experiment

An experiment with rocket mails was carried out recently by the Calcutta Port Commissioners, with the co-operation of the postal and military authorities. A letter mail was safely rocketed 1,000 yards to the shore from a small steamer passing through the estuary of the River Hooghly, thus obviating the mail-boat being delayed in dangerous shoal-infested waters.

A BROAD SMILE: Our old friend Capt. H. S. Broad is pleased with the performance of his 'bus. This happy "snap" was taken when he was testing a D.H. "Dragon." (*Flight* Photo.)

Roumanian Prince's Flight

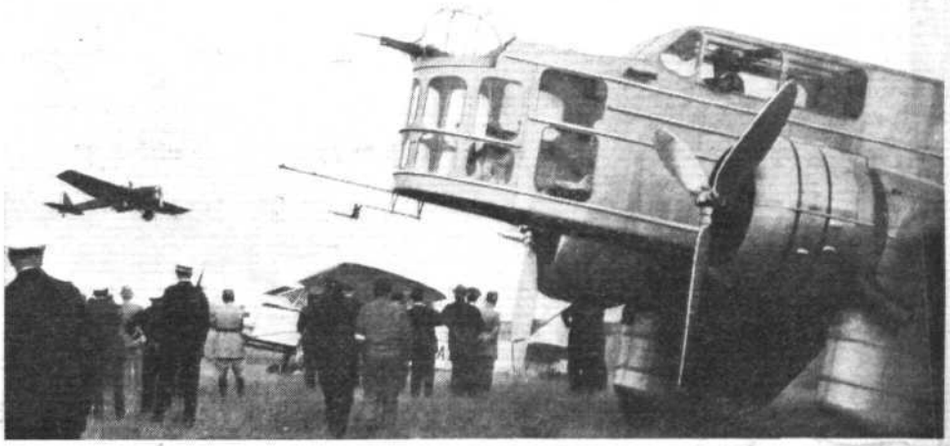
Prince Nicholas of Roumania piloted his own aeroplane last week when he flew from Bucharest to Belgrade in connection with "an important mission." On the return flight he encountered very stormy weather, but handled the machine with exceptional skill.

The Knight Flight Ends

Mr. and Mrs. R. W. H. Knight, who left England on October 8 in their Blackburn "Bluebird" ("Gipsy I") to fly to Kano, Nigeria, arrived there on October 24. They flew *via* the centre route across the Sahara, by way of Laghouat, El Goléa, In Salah, Arak, Tamanrasset, In Guezzam, Agadeo and Zinder.

A New Russian Aeroplane

Known as the "Air," a two-seater aeroplane has recently been constructed by Yakovlev, primarily for use by the Osoaviakhim aero clubs. Fitted with a 100 h.p. M-11 engine, the "Air" has a speed range of 65-174 km./hr. (40-108 m.p.h.), and a ceiling of 5,000 m. (16,404 ft.). It weighs 575 kg. (1,268 lb.), the normal load being 350 kg. (772 lb.), and it carries fuel for 5½ hours.



THE OBSERVATORY: The front gunner's enclosed cockpit on this new Marcel Bloch 130 Bomber is similar to that on our Boulton and Paul "Overstrand."

Diary of Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list.

Nov. 16-Dec. 2. 14th International Aviation Exhibition, Grand Palais des Champs-Elysées, Paris.

Nov. 22. "Air Turbulence near the Ground." R.Ae.S. Lecture by Prof. Dr. Wilhelm Schmidt.

Nov. 23. Lancashire Aero Club Ball, Midland Hotel, Manchester.

Nov. 25. Rugby Match, R.A.F. College v. R.M.C., at Cranwell.

Nov. 28. Hampshire Aeroplane Club Annual Ball, South Western Hotel, Southampton.

Nov. 28. "Seadromes." Lecture by G. O. Williams, at Royal Aero Club. (6.30.)

Nov. 29. "Engine Research." R.Ae.S. Lecture by [illegible] G. Forsyth.

Nov. 30. Yorkshire Aeroplane Club Annual Ball, Hotel Majestic, Harrogate.

Dec. 1. De Havilland Works Annual Dinner, Wharncliffe Rooms, London.

Dec. 4. College of Aeronautical Engineering, Annual Dinner and Dance, Grosvenor House.

Dec. 6. "Flaps and other Devices." R.Ae.S. Lecture by R. P. Alston.

Dec. 6. "Recent Progress of the Autogiro." R.Ae.S. Lecture by Senor Juan de la Cierva. POSTPONED to Second half of Session.

Dec. 7. Martlesham Heath Annual Dinner.

Dec. 13. "Recent Research in Metallurgy." R.Ae.S. Lecture by Dr. W. H. Hatfield.

Dec. 15. York County Aviation Club, Xmas Dinner Party at the Club House.

made quite clear [illegible] structural defect.

THE ROYAL AIR FORCE

Service Notes and News — *Air Ministry Announcements*

FLIGHTS AT GOSPORT

With effect from January 1, 1935, "D" and "E" Flights stationed at the R.A.F. Base, Gosport, will be known as "A" (Torpedo Training) Flight and "B" (Torpedo Experimental) Flight, respectively. The existing "C" Flight is now named "C" (Deck-landing Training and Flying Practice) Flight.

TERRITORIAL SEARCHLIGHT UNITS

It was recently stated in the House of Commons that the Searchlight Units of the Territorial Army, which are part of the Air Defence organisation, were below strength on July 31 to the extent of 33 officers and 1,260 other ranks, and that steps were under consideration which aimed at bringing the units up to establishment. Of the existing strength, 80 per cent. took part in the Air Exercises last July.

THE MIDDLE EAST ANNUAL FLIGHT

The annual formation flight which now usually flies from Egypt to the West African colonies will be carried out in 1935 by four aircraft of No. 8 (Bomber) Squadron, which is stationed at Aden. The present equipment of this squadron is the Fairy 3F, but it has been decided that it is shortly to receive the "Vincent." The formation flight will leave Aden on January 10 and is expected to reach Bathurst, in Gambia, in twenty days. The return flight will be more expeditious, as there will not be the same need to accept hospitality, and the flight is due back on February 15.

No. 3 SQUADRON R.F.C. AND No. 3 (F) SQUADRON R.A.F. REUNION DINNER

The fifteenth annual reunion dinner of the No. 3 Squadron R.F.C., and No. 3 (Fighter) Squadron, R.A.F. Dinner Club is to be held at the May Fair Hotel on Friday, December 7, 1934, at 7.30 p.m. for 8 p.m. Air Marshal Sir Robert Brooke Popham, K.C.B., C.M.G., D.S.O., A.F.C., will be in the chair. Tickets are 13s. 6d. each, and are obtainable from Flt. Lt. D. S. Brookes, R.A.F., Kenley, Whyteleafe, Surrey.

The Squadron since the early days have supplied many names which are historic in Service and civil aviation, and its annual reunion dinner claims to be the oldest in the Service. The secretary is particularly anxious to regain touch with many past members of the squadron, both war time and post-war, and will be glad to hear of the whereabouts of those who cannot attend this year so that their addresses may be noted for future occasions.

LORD WAKEFIELD BOXING COMPETITION AT HENLOW: Air Chief Marshal Sir Edward Ellington presenting the Senior Stations trophy to F/O. [illegible] Brown, captain of the Henlow "A" team.

FOREIGN OFFICERS WITH THE R.A.F.

Lts. Li-Shou Chen and S. K. Lee, of the Chinese Air Service, having completed the eleven months' course at No. 3 Flying Training School, will be attached to No. 16 (Army Co-operation) and No. 9 (Bomber) Squadrons, respectively, as from October 22 to November 24, 1934.

EXAMINATION FOR GROUND ENGINEERS' LICENCES

Examination Boards will sit for the purpose of examining applicants for ground engineers' licences at the following places and times:—(a) London, weekly, on each Tuesday in January, February and March, 1935; (b) Croydon, on the second Friday in January, February and March, 1935; (c) Manchester, on the first Friday in March, 1935; (d) Bristol, on the first Friday in January, 1935; (e) Glasgow, on the first Thursday in February, 1935.

Applications for licences should be made on C.A. Form 2B, which is obtainable on request, and should be addressed to The Secretary, Air Ministry (C.A.2), Adastral House, Kingsway, London, W.C.2. Applications for extensions to existing licences will also be dealt with at these boards, and such applications should be made on C.A. Form 2D to the above address. When forwarding the application the applicant should indicate the provincial centre which he wishes to attend for examination, if he is unable to take the examination in London.

Application for examination at the centres named at (c), (d) and (e) above can only be accepted provided that the application, together with the appropriate fees, is received *twenty-eight days* before the dates specified, and provided also that the total number of applications received is within the capacity of the board. Applicants whose applications are not accepted owing to these provisions will be given the opportunity of early examination in London, or, alternatively, of being placed on a waiting list for the next board to be held in the place in question.

TRANSFER OF OFFICERS TO THE RESERVE

The undermentioned short service, medium service and non-permanent officers should note that they become due for transfer to the reserve, on completing their period of service on the active list:—

JUNE-JULY, 1935

General Duties Branch

Sqd. Ldr. Alan David Macdonald, M.C. (Capt. R.A.R.O.); Flight Lieutenants Cyril Walter, Patrick Edwin Berryman, William Hawkesley Burbury, Maurice Clive Pascoe, Arthur John Lloyd Hughes, Edward John George, Frederick Walter Hick Hall, and George Valentine Thorpe Thomson; F/O.'s John Wilmot Bateman, Roger Brammer Brown, George James Stewart Chatterton, Montagu Victor Murray Clube, Alan James McDougall, John Blackwell Sinclair Monypenny, Douglas Griffith Morris, Maurice Robert Desmond Trewby, Leonard John Crosbie, Ronald Hanson, Alan Harold Hole, Thomas Anthony Jefferson, Dudley Hardwicke Marsack, Francis Guy Mason, Cecil Leslie Monckton, Murray Armstrong Payn, Henry Neville Gynes Ramsbottom-Isherwood, Ian Gibson Ross, Charles Patrick Villiers, and Edward Charles Smith-Ross.

Medical Branch

Flt. Lt. John Frederick Stewart Wiseman, M.B., Ch.B.

Dental Branch

Flt. Lts. David Ivan Malcomson, L.D.S., Reginald George Joseph Charlesworth, L.D.S., Harold Irving Clapperton, L.D.S., William David Guyler, L.D.S., Humphrey Dight Humphreys, L.D.S., John Mitchell Jamie, L.D.S., Paul Marcus Margand, L.D.S., [illegible] Bertram Sumerling, B.D.Sc.

F/O.'s Morris and Crosbie have been selected [illegible] permanent commissions.

ARMAMENT TRAINING CORPS

Aerodrome facilities temporarily ceased to exist at No. 1 Armament Training Camp, Catfoss, from October 22, 1934. These facilities will also temporarily cease to exist at No. 3 Armament Training Camp, Sutton Bridge, from November 12, 1934.

WARRANT OFFICERS' MARRIED QUARTERS

At stations where the number of warrant officers' quarters already in existence is greater than immediate requirements, and where it appears that the surplus is likely to continue, the surplus quarters may be allotted as follows, subject to vacation at one month's notice (i) clerks of works, R.E., (ii) entitled flight sergeants, (iii) non-entitled flight sergeants, (iv) civilians of suitable status who are prepared to occupy the quarters on a rental basis.

NEW F.A.A. STATION

Negotiations are proceeding for the purchase of about 1,300 acres of land on Thorney Island, near Portsmouth, to be made into a station to accommodate units of the Fleet Air Arm when ashore.

ROYAL AIR FORCE GAZETTE

London Gazette, November 13, 1934

General Duties Branch

The following Acting Pilot Officers on probation are confirmed in rank and graded as Pilot Officers:—D. F. Macdonald (Aug. 29); A. M. A. Birch, T. I. Davies, A. A. de Gruyther, J. E. C. G. F. Gyll-Murray, W. A. K. Igoe, F. J. Manning, D. M. Newman, R. V. L. Pattison, B. Robinson, C. F. Sarsby, J. Shepherd-Smith, D. G. H. Spencer, J. C. Taylor, R. L. Vivian (Sept. 22); A. E. Eady (Sept. 27).

The following Acting Pilot Officers on probation are graded as Pilot Officers on probation (Sept. 2):—J. L. Barker, R. B. Middleton, J. A. Sutherland, H. de C. A. Woodhouse.

The following Flying Officers are promoted to the rank of Flight Lt.:—T. W. Hodgson (Sept. 15); M. V. Ridgeway, W. M. L. MacDonald (Oct. 14).

The following Pilot Officers are promoted to the rank of Flying Officer (Nov. 1):—J. H. R. Oldfield, C. Griffiths, A. S. Q. Robins.

Lieut. S. W. D. Colls, R.N., Flt. Lt., R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (Oct. 28); Flt. Lt. M. V. Ward is placed on the retired list at his own request (Nov. 3); F/O. R. W. Hay is removed from the Royal Air Force (Oct. 27).

Stores Branch

The following Flying Officers are promoted to the rank of Flt. Lt (Oct. 15):—C. M. P. Hartley, M. E. O'B. Atkinson, D. G. McDiarmid.

Chaplains Branch

G. W. N. Groves is granted a short service commission with the relative rank of Squadron Leader with effect from and with seny. of Nov. 1.

Legal Branch

H. H. M. Shurlock is granted a permanent commission as Flight Lieutenant on probation with effect from and with seny. of Oct. 22 (substituted for the notification in the *Gazette* of Nov. 6); Sqd. Ldr. G. S. Marshall, O.B.E., is placed on the retired list at his own request (Nov. 1).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

Pilot Officer on probation D. L. Rawnsley is confirmed in rank (July 20).

The following Pilot Officers are promoted to the rank of Flying Officers:—N. Richardson (May 10); P. B. H. Home (Aug. 24); G. N. Beckmann, J. H. Hoggart-Hill (Sept. 8); R. L. Bowes (Sept. 15); K. M. G. Anderson, D. W. F. Barker, R. D. Baughan, J. C. Boulter, B. S. Braithwaite, W. G. M. B. Broomhall, J. C. W. Buxton, R. F. Carnegie, A. B. Corfe, F. A. Currey, F. E. R. Ducker, J. W. Franklin, K. V. Garside, W. H. A. Hibbard, G. R. M. Knox, G. A. P. Manwaring, J. A. Mertens, R. M. Pimm, G. F. Powell, J. C. Reynolds, J. C. Smyth, E. Rosslyn-Stuart (Sept. 20); C. C. J. Barritt, P. J. de Havilland (Sept. 29).

P/O. H. Spooner is transferred from class C to class AA (ii) (May 9).

The following are transferred from class A to class C:—Flt. Lt H. F. Surén (Oct. 10); F/O. H. R. Hughes-Hallett (Aug. 4); F/O L. A. Hackett (Sept. 7).

The following are transferred from class AA (ii) to class C:—F/O. A. D. Baxter (Sept. 20); Pilot Officer on probation D. G. Simmons (Oct. 16).

The notification in the *Gazette* of July 17 concerning F/O. R. S. Sikes is cancelled.

SPECIAL RESERVE

General Duties Branch

Pilot Officer on probation R. T. Corry is confirmed in rank (Oct. 13).

AUXILIARY AIR FORCE

General Duties Branch

No. 600 (CITY OF LONDON) (FIGHTER) SQUADRON.—F/O. C. F. Anderson is promoted to the rank of Flight Lieutenant (Nov. 2); Flt. Lt. G. P. Kerr relinquishes his commission on completion of service (Nov. 2).

No. 608 (NORTH RIDING) (BOMBER) SQUADRON.—R. A. Clay is granted a commission as Pilot Officer (Oct. 20).

AUXILIARY AIR FORCE RESERVE OF OFFICERS

General Duties Branch

G. P. Kerr is granted a commission as Flight Lieutenant in class A (Nov. 2).

TERRITORIAL ARMY RESERVE OF OFFICERS

ROYAL ENGINEERS

ANTI-AIRCRAFT SEARCHLIGHT COMPANIES.

ESSEX GROUP.—Lt. G. N. Whybrow, from Active List, to be Lieutenant (Nov. 14).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commanders.—A. W. Mylne, to Headquarters, Air Defence of Great Britain, Uxbridge, 12.11.34. For Air Staff duties vice Wing Com. L. L. MacLean. P. C. Sherren, M.C., to Home Aircraft Depot, Henlow, 13.11.34. For Administrative duties vice Wing Com. D. Stewart, M.C., A.F.C.

Squadron Leaders.—J. McFarlane, M.C., A.F.C., to R.A.F. Base, Calshot, 4.11.34. For flying duties vice Sqd. Ldr. F. C. B. Savile. J. M. Fairweather, D.F.C., to No. 20 (Army Co-operation) Squadron, Peshawar, India, 10.10.34. To command vice Sqd. Ldr. L. N. Hollinghurst, O.B.E., D.F.C. A. G. Bond, A.F.C., to Electrical and Wireless School, Cranwell, 11.11.34. For Administrative duties vice Sqd. Ldr. A. H. Stradling, O.B.E. C. H. C. Woollven, M.C., to No. 2 Flying Training School, Digby, 10.11.34. For Administrative duties.

Flight Lieutenants.—J. D. S. Denholm, to Station Headquarters, Manston, 4.11.34. D. P. Lascelles, to H.M.S. *Hermes*, 5.11.34. W. R. Hartwright, to No. 2 Flying Training School, Digby, 12.11.34. R. Kellett, to Headquarters, R.A.F., Iraq, Hinaidi, 22.10.34. C. H. Turner, to No. 5 (Army Co-operation) Squadron, Quetta, India, 5.10.34. W. C. Yale, to No. 31 (Army Co-operation) Squadron, Quetta, India, 15.10.34. A. P. Revington, to No. 822 (F.S.R.) Squadron, Manston, 19.11.34.

Flying Officers.—(Hon. Flt. Lt.) I. O'B. MacGregor, to No. 16 (Army Co-operation) Squadron, Old Sarum, 3.11.34. J. G. Younghusband, to No. 65 (F) Squadron, Hornchurch, 28.10.34. R. [illegible] and Wireless School, Cranwell, 7.11.34. [illegible] Aeroplane and Armament Experimental [illegible]am Heath, 8.11.34. T. W. Hodgson, to [illegible] Duxford, 31.10.34.

Acting Pilot Officers.—The following Acting Pilot Officers are posted to No. 2 Flying Training School, Digby, on 3.11.34, for flying training:—A. G. G. Baird, R. D. Blair, A. C. Brown, F. S. D. Burgis, A. A. Case, A. J. F. Churchill, R. N. Cook, M. P. C. Corkery, R. I. K. Edwards, R. M. Elms, T. A. N. Forsyth, C. F. Herington, F. H. Hitchcock, T. S. Jameson, M. M. Kane, C. F. King, C. Kirkley, H. R. Larkin, J. R. Maling, F. L. Newall, B. L. Powell, A. E. Saunders, S. R. R. Smith, P. Stevens, H. T. Sutton, J. M. M. Thompson, N. R. L. Urquhart, K. M. M. Wasse, and D. C. Yorke.

Stores Branch

Flight Lieutenants.—W. G. S. Wood, to No. 5 Flying Training School, Sealand, 7.11.34. W. A. Stagg, to Headquarters, Inland Area, Stanmore, 1.11.34. E. N. D. Worsley, to D. of E., Dept. of A.M.S.R., Air Ministry, 8.11.34.

Flying Officers.—W. G. R. Jarman, to No. 1 Stores Depot, Kidbrooke, 5.11.34. T. J. Kinna, to No. 3 Stores Depot, Milton, 5.11.34.

Accountant Branch

Flight Lieutenant.—D. A. K. Yiend, to Station Headquarters, Heliopolis, Egypt, 15.11.34.

Medical Branch

Wing Commander.—H. A. Hewat, to R.A.F. Depot, Uxbridge, 11.11.34. For duty as Senior Medical Officer and Commanding Officer, R.A.F. Officers' Hospital.

Squadron Leader.—A. E. Barr-Sim, to Central Medical Establishment, 10.11.34. For duty as Medical Officer.

Chaplains Branch

[illegible] G. W. N. Groves, to R.A.F. Record Office, Ruislip, 1.11.34. [illegible] duty as Chaplain (C. of E.). On appointment to a short [illegible]ce commission.

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COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —

GOING AHEAD IN SOVIET RUSSIA

Experiment and Development in the U.S.S.R. since 1922: Air Routes before Railroads

IN a vast territory where dogs, reindeer, camels, oxen, and other animals are still an important feature of long-distance transport, the development of civil aviation is of unusual interest.

The Russian character is invariably associated with genius rather than with clockwork efficiency. It is not surprising, therefore, that the development of aviation in the Soviet Union is chiefly known to the outside world by exploits rather than by the regularity of its time-tables. The work of the Soviet aviator Chuknovsky in the expedition to the Arctic regions for the rescue of the crew of the Italian airship *Italia* is still fresh in the minds of the World, and, more recently, Soviet airmen aroused universal admiration by saving the 102 survivors of the scientific expedition's ship *Chelyuskin* from the drifting ice-floes north of the Bering Strait without a single casualty —even the dogs being rescued by air. That the Soviet scientists are not necessarily behind those of other nations has been shown by the recent flights into the stratosphere.

The Soviet Union has produced a remarkable variety of experiments in the uses of aircraft. Aeroplanes have been employed to fight plagues of locusts in the Caucasus and forest pests in the Nishni-Novgorod province, and for the survey of the boundless spaces of Siberia. Several million acres have been cleared of malaria-carrying mosquitos by spraying from the air, and some hundred thousand acres of cereal crops have been sown from aeroplanes.

An Arctic Air Route

The art of gliding appears to have aroused particular enthusiasm. At the Nineteenth All-Union Conference of Gliders, which was held in the Crimea in October, 1933, it was announced that approximately 10,000 pilots had qualified to fly motorless machines, and that gliders were being used to carry the mails between Koktobel and Simferopol in the Crimea. Another interesting experiment has been the "aerial train." Early in 1934 an aeroplane flew the 530 miles from Saratov to Moscow towing two gliders. A few months later a record was established when a fast "P-5" towed three "G.9" gliders from Moscow to Koktobel, a distance of 800 miles, in less than nine hours

Aeroplanes, too, are being used to conquer the Arctic. At the end of 1933, in the depths of the Siberian winter, the aeroplane "U.S.S.R. No. 5" started the world's first regular air service within the Arctic Circle. This service is for passengers, mails and merchandise, and the route follows the Yenesei River northwards from Krasnoyarsk, on the Trans-Siberian Railway, to Igarsk and thence to Dudinsk near the Taimir Peninsula. Dudinsk is on the 70th degree of latitude and has a mean annual temperature of some 20 degrees below freezing point. Moreover, it is more than a thousand miles distant from the nearest railway.

If the inhabitants of Arctic Russia do not run before they can walk, at least they will fly before they have learnt to use the train. Quite recently an aeroplane—described as an amphibian for lack of a more exact definition—was constructed to operate with equal facility on land, water, snow and ice. It was produced by Soviet designer V. N. Sharov, and is described as the "SH-5." This machine was built by the Civil Aviation Scientific Research Institute to carry fourteen passengers and has two 480 h.p. engines. Its range is 1,250 miles and its speed about 140 m.p.h.

The economic potentialities of such machines in exploiting undeveloped territories can be appreciated when one recollects that the greater part of the Russian coast-line lies within the Arctic circle and much of it is icebound during ten months in the year, while there is no railway in all Arctic Russia with the solitary exception of the recently constructed line to Murmansk.

Owing to the Civil Wars which followed the Revolution and the war of 1920 against Poland, the development of civil aviation in Russia came several years later than in other important countries. The first regular commercial air route was established in 1922 when the German-Russian Company, Deruluft, opened a service between Moscow and Königsberg. In June, 1923, the Dobrolet (Volunteer Aviation Company) was formed, followed shortly after by another company styled the Ukrvozdukhput. The Dobrolet immediately inaugurated a daily service between Moscow and Nishni-Novgorod, using Junkers machines.

Increasingly Rapid Progress

For some years progress was slow, as Soviet aviation was still in the experimental stage. By 1926, however, the length of routes in operation had increased to 4,000 miles against only 750 miles in 1922, and in 1928 passengers, freight and mails were being transported over 7,500 miles of route.

In 1933 the total length of Soviet air lines was conservatively estimated at 13,300 miles. There were forty-four separate air routes and twenty-seven civil airports. There are, however, few up-to-date aerodromes. The most important commercial routes are Moscow-Leningrad (400 miles), Moscow-Tiflis (1,880 miles), Moscow-Tashkent (1,880 miles), Moscow-Irkutsk (2,860 miles), and Irkutsk-Vladivostock (2,200 miles). The complete journey from Moscow to Vladivostock is made in seven stages occupying some fifty flying hours. It is interesting to record that in 1933 more than 41,000 passengers travelled by air compared with only 4,035 in 1926.

The Soviet aircraft industry was created by the first Five Year Plan, prior to which no aeroplane had been entirely constructed in the Soviet Union. The first Soviet-built motor appeared at the end of 1931. Since then a great number of machines have been constructed with materials and engines produced within the country. In view of the great importance which the Soviet authorities attach to it, both from a military and commercial point of view, aviation in Russia is likely to make rapid progress, though for some years to come the Soviet will probably require technical assistance from abroad.

In Russia to-day, as in many partially developed countries, it is easier and quicker to establish a long-distance air-route than to construct a 3,000-mile railway. It is perhaps a sign of the times that in the past ten years Soviet Russia has established a great [illegible] and built relatively few railways.

CHEAPER AIR MAILS

Sir Kingsley Wood Announces Flat Rates for Empire Routes : All Internal Mails to be sent by Fastest Route

FOR a number of years *Flight* has been asking that air mails for all parts of the Empire should be sent at certain flat rates, and now the Postmaster-General has at least partially acceded to the demand.

Last week Sir Kingsley Wood announced that the varying postages over routes covered by Imperial Airways would be adjusted to a rate of 6d. per half ounce for letters to all destinations where the old charge was equal to or in excess of that amount, and 3d. per half ounce where the old charge was lower than 6d.

In other words, letters to Kenya, Uganda, Tanganyika, Zanzibar, Nyasaland, Rhodesia, South Africa, India, Ceylon and Malaya can be sent for 6d. per half ounce, and those to Egypt, Syria, Iraq and Persia for 3d. per half ounce. Postcards need to be stamped for 3d. and 2d. respectively, over the same routes. It will be seen that the reduction in the cost of correspondence to Malaya, for instance, is as much as 6d. When the Karachi-Bombay-Madras route is used there will be an extra fee of 2d. for letters to these places.

The new charges were put into operation last Saturday.

As regards internal mails, the post office has also adopted the general policy of sending normally stamped letters and postcards by air routes when such a course will expedite delivery. Previously it has been the unhappy lot of the air mail devotee to consult time-tables and to affix labels.

Another statement that will be of especial interest to air line operators is that the mails will be sent by any air service which can operate punctually and regularly and whose owners will make an agreement with the Post Office.

Mr. Edward Hillman is to extend his daily service between London, Liverpool and Belfast, to Glasgow, and on this route mails will be carried. Letters posted after the closing of the night mail will be taken out to Essex Airport on the following morning. This service will be started on December 1.

On a basis of competitive bidding, Railway Air Services, Ltd., have lost their contract. Since the inauguration of internal air mails in August they have carried on an average something like 400lb. of mail every day to Belfast, 200lb. to Liverpool, and 50lb. to Glasgow, and have spent a considerable amount of money on running an extra service for mails to the Isle of Man Their charge to the Post Office for the full journey was, roughly, equal to the fare for a single passenger. Hillman's Airways is, incidentally, shortly to become a public company.

However, the fact that the Post Office is prepared to consider everybody indicates a distinct change of front.

Highland Airways, Ltd., will continue to carry the mails to the Orkneys.

For South African Airways

The three Junkers JU.52s (three 650 h.p. B.M.W. "Hornets") which left Dessau on October 29 flew in formation to Johannesburg, and reached the Rand airport on November 5.

New Air Line in Georgia

A new air line has been put into operation between Kutais and Yenukidze, in Soviet Georgia, which are 40 minutes' distance from each other by air. Preparations are being made to open a regular air service between Kutais and Upper Svanetia.

Encouraging Diesel Design

A prize of £125,000 has been offered by the French Air Ministry to the constructor of the first crude-oil motor which will enable an aeroplane to average more than 93 m.p.h. over a closed circuit of 6,240 miles. The competition closes on January 1, 1937.

A Trans-Pacific Air Service

Six Sikorsky S42 flying boats have been ordered by Pan-American Airways, ostensibly for use on a trans-Pacific service which is to be started in the near future. The Post Office Department is interested and has, in fact, influenced the company in its decision which has not, incidentally, yet been confirmed.

The Qantas Tragedy

The fourth machine (a special D.H.86) to be sent out to Australia for use on the Singapore-Brisbane section of the Australia service crashed shortly after leaving Longreach (Queensland) on November 15. Flt. Lt. R. A. Prendergast, a South African pilot of long experience on the Imperial routes, W. V. Creates, F. R. Charlton and E. Broadfoot, of the Shell Company, lost their lives.

The machine was not being flown by Flt. Lt. Prendergast at the moment of the accident.

In the meantime the Qantas plans are in abeyance until a report has been made, and the D.H.86, which was taken out by Mr. L. J. Brain, will not, it is said, be flown until it is made quite clear that the accident was not caused by any structural defect.

Night Landings at Brindisi

Permission for night landings in Brindisi Harbour has now been received, and the station is in a position to handle aircraft after dusk.

An Eye for an Eye

Air France has been exempted by the State of Pernambuco from various customs dues for the next ten years, the condition being that machines must call there at least twice a week.

A Danish Appointment

Mr. Knud Lybye has been appointed general manager of the Danish airline operating company, Det Danske Luftfartselskab A/S, in place of Mr. Knud Krebs, who, we regret to state, died on October 8.

Air Transport in N.W. Canada

On his return to Ottawa after a 14,000-mile inspection of the trans-Canada air route and the commercial air routes of the Dominion, Mr. J. A. Wilson, Controller of Civil Aviation in Canada, reported considerable activity in aeroplane transport business in the Canadian North-West. He stated that development in the North, particularly around Great Slave and Great Bear Lakes, was proceeding at a great rate. The trans-Canada air route, he added, would not be completed this year, although many of the landing grounds across the Dominion were nearly ready.

The International Aircraft Register

The sixth conference of the I.A.R. was held recently at Friedrichshafen. Formed seven years ago, the Register brings under one head the Bureau Veritas the Germanischer Lloyd, the Japanese Corporation of Shipping, the Norske Veritas, and the Registro Italiano. The first result of the Register's work was the publication in four languages of a Surveyor's Handbook, defining the methods of aircraft inspection.

At the recent conference, proposals submitted by its technical committee for the elaboration of certain statistics for underwriters and for the modification of calculations have been accepted, and the societies have come to an agreement upon many important points concerning aircraft flying tests, engine tests and the inspection of metal propellers.

Commercial Aviation

CROYDON

High Winter Bookings : The "Irish Swoop" Leaves : Cheaper Air Mails : Streamlined Sloth : The Qantas Tragedy

IN spite of unpleasant weather, the passenger bookings on all lines have been extremely good during the past week. During the week-end several companies, including Imperial Airways and K.L.M., duplicated services, and on Saturday Imperial Airways took eighty passengers from London to Paris alone.

Three supporters of the Italian football team arrived by Imperial Airways at 2 p.m. on the day of the match and, taking a fast car, arrived at the ground at 2.30 p.m. Afterwards they caught the 6.30 p.m. air liner to Paris. They had travelled all night by train from Spain to link up with the Imperial Paris-London service. I hope they saw good football to justify the journey—but I doubt it.

That unlucky aeroplane, the *Irish Swoop*, has finally left Croydon, piloted by Mr. Bonar, for Southampton. It is to be shipped from there to the U.S.A. for modifications. They appear to be needed.

Just a Party

Amongst important passengers last week were Gen. Smuts, Mr. Fokker, and Mr. Sikorsky. The latter was outward bound to Paris after his recent lecture before the Royal Aeronautical Society. Last Friday also the English Ice Hockey team flew by D.L.H to Berlin, where they played a match the same evening.

A special "Scylla" was chartered to carry accessories to Paris for the Mdivani-Woolworth party which cost such a lot of money. These accessories were members of the orchestra, cabaret troupe, and some odd guests. The machine brought back much the same sort of load next day.

A freight consignment which aroused much interest came from Delhi *via* Imperial Airways recently. This was a magnificent specimen of a Persian rug, very old, and with the mellow colouring only age can give—a wedding gift to the Duke of Kent and Princess Marina from the Viceroy of India and Lady Willingdon.

Some of the people who are accumulating the largest number of flying hours are the stewards of Imperial Airways. They stick to the same aeroplanes and are not moved about as the pilots are. I am told that Messrs. Jeffcoate and Steer, the two senior stewards, have something like 23,000 hours to their combined credit.

Saturday, November 17, marked a step forward in air mail progress. Brig.-Gen. Sir Frederick Williamson, Director of Postal Services, was at Croydon to see the Imperial Indian mail machine depart, and to hand a mail bag to the pilot. The occasion was the establishment of a long overdue flat rate of postage on Eastern and African routes.

Sometimes the brightest ideas of Government departments are pathetic failures owing to refusal to consult those engaged in the practical side of the business. We get it with the Air Ministry in matters such as beacons and other devices supposed to assist flying. On Saturday the G.P.O. triumphantly produced a streamlined mail van which is supposed to accelerate ground transport of mails between Croydon and the City. I am convinced that Imperial Airways were not consulted, and probably the thing was kept a jealous secret also from the Air Mail Section of the G.P.O. The car is a marvellous shiny blue affair with a practical disadvantage—it is too small to hold the amount of mail frequently carried from Croydon, which amount is continually increasing. The streamlining is unlikely to benefit the G.P.O. between London and Croydon, where speeds of 60 m.p.h. and over are not usually attainable, and, anyway, it has a stop on the accelerator, I am told, which prevents it moving faster than 35 m.p.h. On its first appearance last Saturday, an auxiliary van had to be used to bring the bulk of the India mail to Croydon. It is, however, a beautiful and, I suppose, an expensive toy.

Telling the Passengers

The need for a loud speaker in the main hall at Croydon is growing daily more evident. At Le Bourget they have had one for a long time, but at Croydon passengers have to be called when machines are departing or when passenger cars are about to leave for London. Considerable delay would be obviated by this means, especially as the main hall is apt to be thronged with sightseers at departure and arrival times, and there is no adequate provision for issuing them with tickets. This is done at a little table just within the main entrance where passenger coaches draw up, and I have seen the whole doorway blocked by visitors, many of whom make frenzied efforts to buy sixpenny tickets from officials of the air companies who are attempting to deal with passengers.

I understand that the Qantas D.H.86, which was to have left here last Monday, commanded by Capt. Youell, will not leave for the present. Although Capt. A. R. Prendergast, who lost his life in the recent unfortunate air accident in Australia, had spent most of his service with Imperial Airways, Ltd., he was one of those typical air liner commanders who was popular and well liked by everyone at Croydon. His loss, with that of Mr. Creates, his first officer, will be deeply deplored. Mr. F. R. Charlton, who was well known at Croydon, had some 6,000 hours' flying to his credit as a flight engineer, and he had been with Imperial Airways for a considerable time. Many friends will miss him at the Airport of London.

A. VIATOR.

Night Flying at Rangoon

Two new searchlights with red reflectors have been erected at Rangoon aerodrome, one on the north and another on the south masts of the D./F. station.

Misr Airwork Director in Europe

The managing director of Misr Airwork, Mr. K. Eloui, left Egypt on October 24, by K.L.M., on a short business trip to Holland, England, France, and Italy, where he will take the opportunity of inspecting the latest types of commercial aircraft.

Wireless Help in Siam

The wireless station at Bandon, Siam, has now been completed, and will materially assist the Imperial service, as it bridges the radio gap between Bangkok and Penang—where, incidentally, two metalled runways are to be laid down.

U.S.S.R. Academy of Sciences and Air Transport

The transport reconstruction commission, under the Academy of Sciences of the U.S.S.R., is actively preparing for the January session of the Academy, which will be devoted entirely to questions of transport.

A report on air services is being drawn up by a special group headed by Academician Chaplygin. The work of this group is concentrated on problems covering aviation motors consuming heavy fuel, the organisation of a proper meteorological service and the safety of air lines. The group consists of the most outstanding Soviet aviation experts, such as A. N. Tupolev, the designer, and Professors Dubenski, Mogilianski, and Nekrasov.

Aiming High

The Soviet Union evidently believes in asking a lot in order that they may receive a little. In a State competition for new high-speed mail and passenger aircraft designs maximum speeds of 249-280 m.p.h. are required with landing speeds of 47-56 m.p.h. The service ceilings in the cases of both single engined five-passenger and twin engined twelve-passenger types must be well over 20,000 feet. In each case the machines must be equipped with 700-850 h.p. engines, of Soviet design, and must be ready before 1935.

Anyway, the Soviet engineers may produce something really useful in the way of flapped, variably supercharged and "variably airscrewed" machines before the closing date of the competition.

Blackpool and Squire's Gate

In keeping with the town's motto, "Progress," Blackpool Corporation have become one of the first municipalities in the country to own two aerodromes, for included in a big land deal, just completed, is Squire's Gate Aerodrome used by Blackpool and West Coast Air Services, Ltd. The Corporation already have Stanley Park Airport, but it is rather appropriate that they should have bought Squire's Gate, as it was on this site that in October, 1909, they promoted the first aviation meeting ever held in this country. It is probable, however, that the use of Stanley Park will eventually be discontinued.

HESTON

Colour Schemes : Engine Overhaul : A Q.B.I Story : Another Interesting Birkett Charter

AEROPLANES have one advantage over cars in that it is possible to let oneself go over the colour schemes without being accused of vulgarity. People sweep into Heston in discreetly-coloured cars and transfer themselves and their luggage to aeroplanes of all the colours of the rainbow.

Housed at Heston now are some beautiful colours and finishes, the most striking, perhaps, being M. Duprey's Farman in a balanced scheme of cream and navy blue; the most original is certainly Lord Apsley's Parnall "Elf," on which the paintshop appears to have run amok; and the prettiest is Mrs. Spencer Cleaver's Percival "Gull."

The latest spray-painting order—for the Standard Telephones and Cables, Ltd. "Puss Moth"—displays a broad-minded neutral spirit in the inter-university rivalry over which even diplomats lose their equipoise and scrap like children.

Although aero engines of necessity come in for overhaul every few hundred hours, the approach of winter lays up a number of commercial machines and many overhauls are fitted in for convenience at this time. Consequently the shops of Airwork Engine Service, Ltd., are full. Engines now in hand include a further batch of three Wright "Whirlwinds," five "Gipsy Majors," a "Lynx," and a Napier salvaged from the bottom of a canal in Belgium.

Airwork Engine Service, Ltd., is believed to possess the only Heenan and Froude universal brake test plant in the south of England. Every engine after its complete overhaul is tested on this plant.

The fog which prevailed during the greater part of last week caused several aeroplane owners, who had no wireless, to wander from the straight and narrow path. Two Polish gentlemen, Mr. M. Grabinski and Capt. R. Hirszbandt, began the series of adventures by whistling into Croydon against orders when it was in a state of "Q.B.I." "No speak Engleesh" was their unanswerable defence.

On November 14, Birkett Air Service received a telephone call at 10.30 a.m., ordering a machine to rush a passenger to Havre. The weather was extremely bad, and one taxi firm at another aerodrome had already turned the proposal down on the grounds that it had no aircraft equipped with wireless. A "Puss Moth" with wireless was ready on the tarmac when the passenger arrived, and it left Heston at 11.10 a.m. to catch a boat leaving Havre for Plymouth at 2 p.m. The somewhat unusual itinerary is explained by the fact that the passenger, Mr. Sutro, a film magnate, wished to travel on the New York boat from Havre as far as Plymouth in order to discuss film matters during the journey with one of the New York passengers.

The aeroplane arrived at Havre, where the aerodrome is only a few minutes from the docks, at 1.25 p.m., thanks to wireless guidance. The passenger caught his boat and left Birkett's pilot to tackle, successfully, the Customs officials in the town.

Flt. Lt. Bulman, chief demonstrator of the Hawker Aircraft Co., left Heston for Paris on November 13 in restricted visibility, flying the latest "Super Fury," "Hyper Fury," or whatever is the correct superlative to apply to the newest of this prolific family of fighters.

[Actually, a "Fury" Mark II Day and Night fighter.—ED.]

Mr. Robert Kronfeld, the Austrian gliding expert, visited Heston recently. He is an expert power pilot and gave a very good account of himself when tested out by Wrightson Air Hire prior to chartering a "Leopard Moth."

INDIAN DEVELOPMENTS

Should Calcutta, Lahore and Bombay be Linked through Cawnpore? : Indian National Airways' Service Extensions : Calcutta's New Airport

A LETTER has been addressed by Indian National Airways to the Government of India, members of the Indian Legislature, and the Indian and European Chambers of Commerce containing proposals for linking Calcutta in the east through Cawnpore with Lahore in the north and with Bombay in the west.

They say that they look for the night lighting of these lines, and that a machine leaving Bombay in the evening could reach Cawnpore at about midnight and arrive at Calcutta early in the morning. A machine leaving Cawnpore, after the arrival of that from Bombay, could be at Delhi two hours later and at Lahore early in the morning. This could leave Lahore again in the evening and reach Cawnpore in time to meet there the machine from Bombay, so that the loads brought from both sides could continue to Calcutta together.

The cruising speed on which the Bombay-Cawnpore-Calcutta service time is calculated is 140 miles an hour.

National Airways in their new proposals refer to their projected services as falling within that northern India area with which they are particularly concerned, and mention "the south" as the region for air development by Tatas.

Incidentally, the Council of the Merchants' Chamber of the United Provinces stress the point that Cawnpore has a better claim than Allahabad to be the principal airport, being the biggest distributing commercial and industrial centre in the United Provinces.

In the meantime the decision of the Government of India to improve the facilities for commercial aviation has given an impetus to its development which is reflected in the announcement by Indian National Airways of certain extensions.

Their existing Calcutta-Rangoon weekly service *via* Chittagong, Akyab and Bassein is to be duplicated. It was proposed to cover this extra service this month, when there will be three services weekly in each direction between Calcutta and Rangoon.

They are also planning to extend their Calcutta service into Assam at the conclusion of the monsoon.

The Karachi-Lahore weekly mail service, which is to be operated by the company to connect with the Empire service at Karachi, is expected to start at the beginning of December. This service will carry mails and passengers, and will be scheduled to leave Lahore on Tuesday afternoon, and after a halt for the night at Jacabbad or Sukkar, will arrive at Karachi on Wednesday morning. In the reverse direction the service will leave Karachi on Thursday afternoon and arrive in Lahore on Friday mornings.

The company has taken over the operation and maintenance of the Government's Avro Ten, which, hitherto, has been operated by R.A.F. personnel. This machine will be located at Delhi, and will be used by Government officials for their tours, and will also be available for the general charter work undertaken by National Airways.

Calcutta's new airport is located behind the Khidderpore Docks, on land recently reclaimed by the Port Trust.

The aerodrome will be triangular in shape, and the ground, being on a high level, drains fairly rapidly. But Indian Air Survey and Transport, Ltd., who are preparing the ground, are laying down an extensive system of local surface drainage. It is anticipated that the airport will be suitable for all types of aircraft during the coming cold weather. It may, however, be necessary to close a part during the next monsoon—i.e., 1935—when a certain amount of settling will no doubt take place on the newly-filled areas.

Meanwhile, Karachi is to remain India's leading airport. Administrative buildings, adequate to meet all requirements of the aerodrome control, are to be erected at an early date.

In order to meet the demand for land necessary for the purpose, it is likely that more will shortly be acquired. Provision has also been made for a new aerodrome hangar, with a span of 140ft., which will be long enough to take the largest type of aeroplanes likely to operate in the East.

Karachi, which is now the most completely equipped aerodrome in the East as regards lighting facilities, will also, under the new scheme, be equipped with electric boundary lights. An Indian aerodrome officer will be deputed to take charge of the aerodrome operations, and additional officers, selected by the Public Service Commission, will be attached to the airport.

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

THE BULK OF AIR MAILS

[2977] The idea that the D.H. "Comet" can be used as a mail carrier by taking out so many pounds of petrol and substituting the same weight of mail, is one which has appealed to a good many non-technical writers. Unfortunately, it is not quite so simple as that, because mails take up three or four times as much room as the same weight of petrol.

The removal of about two-thirds of the petrol (say 165 gallons) would allow 1,200lb. more useful load, but on the Government allowance of 86 cubic feet per 1,000lb. of mail it would leave room for no more than 325lb., which is, I believe, a good deal less than the weekly air mail to India.

West Drayton, Middlesex. E. N. B. BENTLEY.

THE G.P.O. AND AIR MAIL ENQUIRIES

[2978] Recently I wished to discover the latest time by which I could post a letter in Paris at night so that it should arrive in London by the first delivery on the following day.

The obvious course, which I followed, was to telephone the Central Enquiry Office at the G.P.O. There, after some little delay, I was informed that if I used the air mail my letter could in no circumstances be delivered in London before 3.30 p.m. I was advised to post before 5.30 p.m.—which was too early for my purpose—when my letter would reach London by surface transport by the first delivery on the following day.

Sceptical of this reflection on the air mail, I then telephoned the Air Mail Enquiry Office at Imperial Airways, and was promptly informed that I could post a letter up to 5.30 a.m. at the Paris G.P.O., that it would travel by the Air France freighter leaving Le Bourget at dawn, and that, if marked "Express," it would be delivered in London by the first morning post. Moreover, my informant was considerate enough to remind me to purchase the necessary "Express" label before the post offices closed, and even volunteered the address of the nearest post office to my hotel in Paris.

The courteous efficiency of Imperial Airways, who did not hesitate to recommend a rival air line for the convenience of an air mail user, is in rather striking contrast to the service given by the G.P.O. Enquiry Bureau.

The latter is presumably either ignorant of matters about which it should be best informed, or prohibited from "advertising" foreign air services where these compete with British services.

Neither hypothesis is likely to be conducive to encouraging the use of the air mail. T. STANHOPE SPRIGG.

FLYING BOAT SERVICES

[2979] In your Aircraft Industry Number you suggest a flying boat service to Malta *via* Gibraltar, which, flying night and day, could reach Malta in twenty-four hours. It should be possible to-day for passengers and mail to reach Malta from London, *via* Marseilles, in about fifteen hours. Using D.H. 86's the journey to Marseilles *via* Paris could be made in about six hours. Two hours should be allowed for ground transport between airport and harbour at Marseilles.

A short "Kent," or, preferably, something faster, such as a civil version of the "Perth," could then reach Malta non-stop in seven to eight hours. A night "landing" would have to be made there, but, surely, with the necessary equipment this should be quite feasible. The flight could be continued to Cairo the next day, bringing this city within two days of London, instead of three as at present. By the use of fast amphibians the delay at Marseilles would be avoided and several hours saved.

Flying boats could also be used to cross the Bay of Bengal, stopping at the Andaman Islands for refuelling purposes. This would bring Singapore within a day's flight of Calcutta, even if 100 m.p.h. boats were used.

The overseas route to Cairo should solve many of the political problems which face Imperial Airways. As for the Paris-Marseilles section, would not an undertaking by Imperial Airways not to carry local traffic provide a solution to the present problem? D. GILBERT.

Wimbledon.

OPENING THE LISBON-TANGIER SERVICE

Ceremonials at Alverca Aerodrome, Lisbon : A Link with Air France

The official inauguration of the Aero-Portuguesa service, linking Portugal with the Air France line to South America, took place at Alverca International Aerodrome on October 20. A motor-coach left the company's offices in the Rua do Alecrim at 8.20 a.m., and drew up beside the waiting aircraft on the aerodrome at 9 a.m. Thus the aerodrome is forty minutes from the centre of Lisbon.

The first machine used on this service is a Fokker F.VIIb-3m (powered with three Gnome-Rhône "Titan" engines), and it is called *La Joyeuse* (a name to live up to).

There is no special accommodation for civil aviation at the military aerodrome at Alverca, and the Fokker stood among quite a number of "Tiger Moths," Morane-Saulnier 233's, and Vickers "Valparaisos" belonging to the Portuguese Military Air Force. For Tangier there were but three passengers—Señor Vasconcellos, managing director of Aero-Portuguesa, Ltda.; Señor Artur Portela, who represented two important Portuguese daily newspapers; and Mijnheer Rosen, a Dutchman. Thirteen kilogrammes of mail were also loaded.

A large gathering of representatives of the Portuguese Government, of the various Ministries, the Director of Military Aeronautics, propaganda and commercial associations, native and foreign Press, and a crowd of sightseers, were also present. The Customs formalities took a considerable time, seeing that there were only three passengers, and it was not until 9.47 a.m. that the Fokker finally took off on the first official service to Tangier.

The pilot, M. Jean Denis, of Air France, had been sitting in his cabin, in the direct rays of a hot sun, for at least forty minutes, and one will never forget the expression of supreme boredom on his face, or the relief which he showed when at last he opened out his engines after some twenty minutes of idling to warm them up.

It is to be hoped that the Portuguese Military Air Force will learn in future that it is definitely not usual, in other countries, to give flying displays in the vicinity of a commercial aircraft which is patiently awaiting the embarkation of passengers!

La Joyeuse arrived at Tangier at 12.37 p.m.—just 2 hr. 50 min. after unsticking at Alverca.

The passenger fares are, incidentally, pretty stiff, and the postal rates also are high—one heard it said by one of the directors that they are the highest in the world!

Two months ago, in an interview accorded to the Lisbon Press, Señor Vasconcellos, the manager of Aero-Portuguesa, Ltda., said that the Lisbon-Tangier Air Service would be the only unsubsidised air line in Europe. This really reveals how little is known of the British air lines now running without subsidy, and it provokes one to add that, were it not for the manifest wish of Air France to insert the thin end of the wedge in Portugal, it would not be possible for Aero-Portuguesa, Ltda., to maintain a weekly air line with a capital of only about £1,454. This, perhaps, explains why Air France have let out, on a three months' charter to Aero-Portuguesa, Ltda., an old type of aeroplane withdrawn from their other lines. It is thought that in three months it will be found that either the air lines will pay or will not pay—and Air France will not stand to lose or gain much.

MODELS

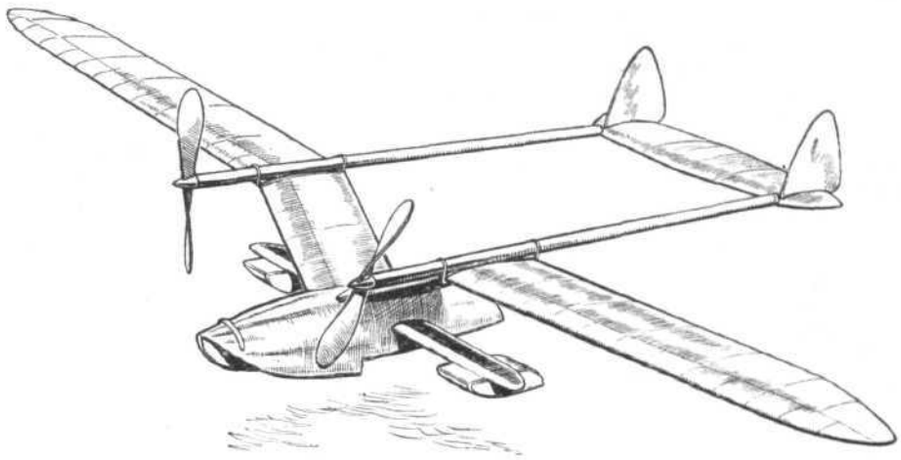
A Section, Appearing Each Month, Devoted to the Progress and Development of Model Aeronautics

MODERN MODELS

The Willis Twin-Tractor Flying Boat

THIS is an experimental model constructed by Mr. A. M. Willis, T.M.A.C., S.M.A.E., possessing several unique features, and has proved a successful forerunner to an improved series of "production" models of similar type. The wings, double surfaced, are constructed of spruce and balsa covered with red Japanese tissue, doped, the tail being of bamboo similarly covered. The float has a single step and V bottom, and is constructed of spruce and balsa, with a covering of sheet balsa and silk. Rubber motors, driving tractor screws in opposite directions, are contained in paper tubes (spiral wound) which also serve as the tail booms. The airscrews are fitted with "free-wheel" device so that they can rotate after the motor has run out. This model rises off and lands on water in fine style. The principal characteristics are:—

Span, 35in.	Overall length, 21in.
Chord (mean) 3.75in.	Length of float, 12in.
Weight, 3.5 oz.	Duration (to date), 30 sec.



ORIGINALITY: A model twin-tractor flying boat constructed by Mr. A. M. Willis.

LANCASHIRE MODEL AIRCRAFT SOCIETY

THIS Society, which furthers the science and sport of model aeronautics in the North, is affiliated to the S.M.A.E., and associated to the Royal Aeronautical Society (Manchester Branch). Experiments are carried out with all types of model aircraft, and flying meetings and competitions are held at local aerodromes throughout the year. Members are now concentrating on flying scale models of various types of well-known aircraft, and these will be exhibited at the forthcoming Hobbies and Models Exhibition, to be held at the City Hall, Deansgate, Manchester, from January 2 to 12, 1935. At least three of the machines will be powered by small petrol engines, and these models will have a wing span of between six and eight feet. About twenty scale models powered by elastic will also be shown. Full details of membership and subscriptions can be obtained from the Hon. Secretary, Mr. F. Hempsall, 81, Queen's Road, Cheadle Hulme, Cheshire.

SKYBIRDS

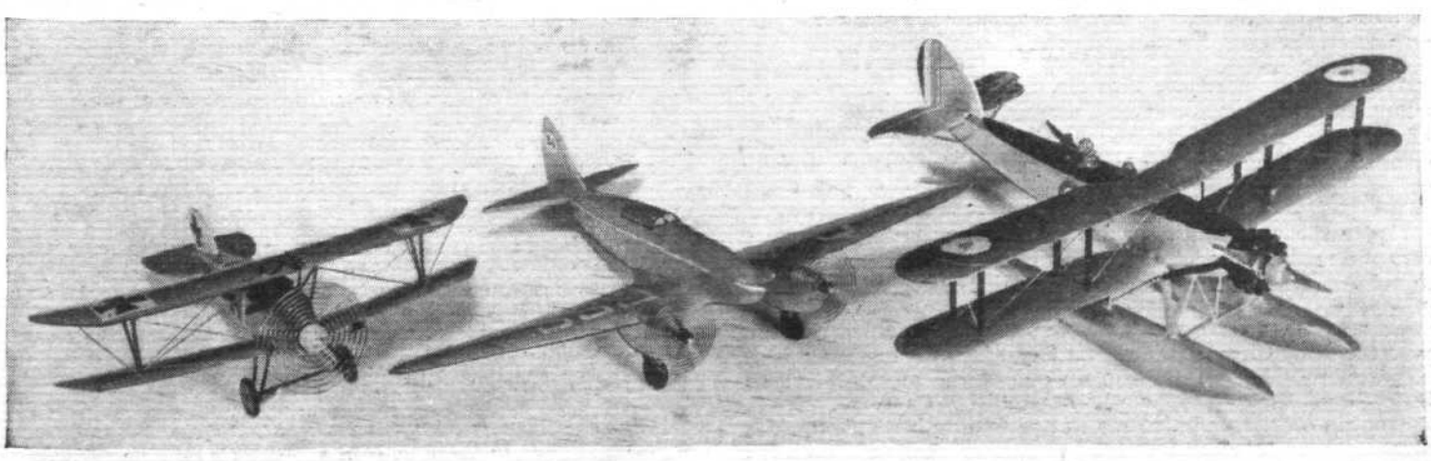
A VERY interesting series of aeroplane models were entered by members of the Skybird League for this competition. The judging took place on October 29 at the offices of the Aviation Society. The judges were Lieut.-Com. the Hon. Robert Southwell and Eric Vernall, Esq., assisted by experts from Skybird headquarters. In addition to the silver trophy, there were sixteen flying awards. The winning models were exhibited at Hamleys, in Regent Street, where on Wednesday, November 7, there was a gathering of League members and friends for the presentation of the awards by Mrs. E. Vernall. The silver trophy for best model irrespective of age was won by Mr. A. W. Newman, who is leader of Skybird Club 98. The four dual control flights for competitors over sixteen were won by: E. Palmer, associate member 4a; H. W. Gibbons, Club 166; B. Nicholson, associate member 94; R. A. Barnwell, associate member 88. A special award by Sir Harry Britton was presented to Master J. Moore, of Club 17, who also received one of the twelve tickets for joy rides for competitors under sixteen.

Several new types have been added to the "Skybird" 1-72nd-scale model aircraft kits, including the following: Handley Page "Heyford" night bomber; S.E.5; Airspeed "Courier"; Fairey "Gordon" and "Seal"; D.H. "Comet"; and Albatros D.III.

A NORTHERN HEIGHTS "SOCIAL"

ON Tuesday, December 4, the Northern Heights Model Flying Club is holding a social evening at St. Stephen's Hall, Elthorne Road, Hornsey Rise, London, N.19, from 8 to 11 p.m. The principal event will be a lecture entitled "Flying Over the Empire," dealing with the activities and growth of Imperial Airways, Ltd., illustrated by lantern slides. Other items have been planned for the remainder of the evening, consisting chiefly of a competitive nature, for which cash prizes have been promised. The Club also hopes to hold a display of its handiwork, while musical interludes will fill up the odd gaps.

Admission will be by ticket only, price 1s. each (inclusive of refreshments), which may be obtained on application to the Hon. Sec., H. C. Chatterley, 9, Landrock Road, Crouch End, London, N.8, or to the Assistant Secretary, A. H. Hargreaves, 168, Elthorne Road, Hornsey Rise, N.19, and to C. A. Rippon, c/o F. R. Barnard, 2a, Hornsey Rise, N.19. This "social" is open not only to Northern Heights members and their friends, but to members and friends of other clubs.

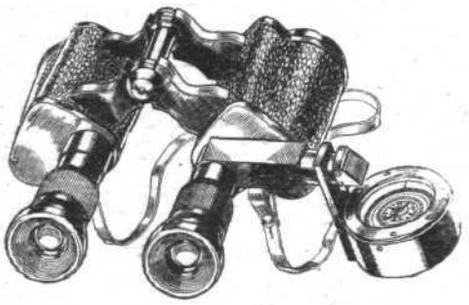


"SKYBIRDS". Three recent additions to the realistic 1-72nd-scale models produced by A. J. Holladay & Co., Ltd. They are: Albatros D. III; D.H. "Comet"; and Fairey "Seal." (*Flight* Photo.)

THE INDUSTRY

FOR TAKING BEARINGS.

KNOWN as the Lloyd Owen "Compoculars," a useful instrument has been introduced by which it is possible for the navigator to focus on an object at any angle and to read off its bearing simultaneously.



The Lloyd Owen "Compoculars."

Briefly, the instrument consists of a pair of binoculars made by Negretti and Zambra to which is attached an arrangement of prisms and a small compass. The two instruments may be used separately, and the compass rotates on its mounting so that bearings can be taken of objects in elevation or depression while the card remains in a horizontal plane.

The operator simply sights the object in the ordinary way, and the actual magnetic bearing is shown in the upper quarter of the field of vision, both by day and night, for the compass has a luminous disc.

Although the instrument is hardly accurate enough for intensive navigation on long flights, it should prove useful for general work in the air, and would be of considerable value to the yachtsman—for whom it was originally designed.

The "Compoculars" can be obtained, at £18 complete in cases, from either Negretti and Zambra, or Capt. O. M. Watts, Ltd., 20-22, Maddox Street, W.1.

An extremely ingenious inclinometer attachment is also being developed, and should shortly be on the market.

FOR A GOOD CAUSE

A lecture on Aviation and the Empire, by Colonel McVittie, and an exhibition of Model Aeroplanes in charge of Mrs. Nigel Norman, are among the many attractions at the Christmas Market being held in aid of the People's Dispensary for Sick Animals of the Poor at Dorland Hall, Regent Street, on December 6 and 7.

"YACCO"

Information concerning the advantages of "Yacco" lubricant for aero and motor car engines is given in a leaflet just issued by Yacco, Ltd., Roxby Place, Seagrave Road, London, S.W.6. "Yacco" oils are treated by a special process which makes them stabilised against oxidation and polymerisation.

A HESTON APPOINTMENT

Henlys, Ltd., of Heston Airport, who are agents for Avro aircraft and Autogiros, and who have a large business in new and second-hand aeroplanes, announce the appointment of Mr. A. Barrett to their staff as salesman-demonstrator.

OBITUARY

We regret to announce that Mr. H. E. Pooley, who had for many years been manager of the Aero Sales Department of Rolls-Royce, Ltd., in London, and who was well known to members of the aircraft industry, passed away on November 15.

"THE LUCK OF THE GAME AGAIN"

Under the title "The Luck of the Game Again" comes a very interesting booklet containing the story of the Thirteenth Royal Automobile Club's International Tourist Trophy Race of 1934, told by Barré Lyndon, with the assistance of numerous excellent illustrations. This classic motor race, which was run over the Ards Circuit, Ulster, on Saturday, September 1 last, was won by C. J. P. Dodson on one of the new "N" type M.G. Magnettes (1,287 c.c.), entered by Capt. G. E. T. Eyston, in 6 hr. 13 min. 24 sec., at 74.65 m.p.h. This booklet is issued by the Publicity Dept. of the M.G. Car Co., Ltd., Abingdon-on-Thames, Berks, who will be pleased to send a copy to any *Flight* reader who may be interested.

NEW COMPANIES

AVIATION DISPLAYS, LTD., Salisbury Square House, Fleet Street, E.C.4 Nominal capital, £100 in £1 shares. The objects are to promote and encourage aerial navigation, to organise and hold or assist in organising and holding aeroplane and other aircraft shows and exhibitions and competitions of all kinds in any part of the world, etc. The first directors are: Herbert G. Wines, "Glenville," London Road, South Benfleet, Essex. Ernest N. Westfield, 17, Charlotte Road, Wallington, Surrey (director of Charles Atkins and Nisbet, Ltd.).

REDHILL FLYING CLUB, LTD. Capital £5,000 in £1 shares. Objects: to carry on the business of carriers of persons for pleasure flights, carriers of passengers, goods and mails, proprietors of aerodromes, club proprietors, etc. The directors are:—Jas. H. Edwards, "Woodside," Cranham, Glos. Alfred A. Douglas, "The Wynstones" Brookthorpe, Glos. Alfred G. Douglas, Ham Farm, Nutfield, Surrey. Geoffrey C. Last, Ham Farm, Nutfield, Surrey. Solicitor: Chas. E. Edwards, 16, St. Andrews Crescent, Cardiff.

INSURANCE FLYING CLUB, LTD., 7, Union Court, Old Broad Street, E.C.2 Capital £500 in £1 shares. Objects: to carry on the business of instructors in aviation, aerial navigation, aerial and ground signalling, dealers in and importers and exporters of aircraft and aircraft engines, transporters of passengers and goods by air, etc. The directors are: Digby King, Rutland House, Charleville Rd., West Kensington, W.14 (Director of Chalume Ltd., and other companies); James K. Wiltshire, 6, Essex Grove, S.E.19. Solicitor: F. G. Bowles, 282, High Holborn, W.C.1.

THE CAMBRIDGE AERO CLUB, LTD. 18, Jesus Lane, Cambridge. Nominal capital, £800 in 700 shares of £1 each, and 2,000 shares of 1/- each. The objects are to promote, encourage and develop the sport, science and practical application of aviation and aeronautics to establish and maintain a club, etc. The management is vested in a council, the first members of which are:—David G. Marshall, White Hill, Cambridge. Arthur G. G. Marshall, 95, Milton Road, Cambridge. Dan Morley, 182, Milton Road, Cambridge, engineer. Edward J. E. Parr, 32, Hardwick Square, Cambridge, accountant. Leonard G. North, 33, Guydir Street, Cambridge, sales manager. Miss Violet M. Marshall, White Hill, Cambridge. Mrs. Rosemary W. Marshall, 95, Milton Road, Cambridge. William Morley, 20, John Lane, Cambridge, garage manager. David G. Marshall and Arthur G. G. Marshall are directors of Marshall's Flying School Ltd., and partners in Marshall's Garage.

CHANGE OF NAME

ROLLS AIRPORT & CONSTRUCTION COMPANY LTD., 18 Hereford Road, Monmouth. Name changed to Rolls Construction Company Ltd.

PUBLICATIONS RECEIVED

Achievements of 1934. London: C. C. Wakefield & Co., Ltd., Cheapside, E.C.2.

The Book of Speed. Price 5/- net. London: B. T Batsford, Ltd., 15, North Audley Street, W.1

Aircraft of the British Empire. By Leonard Bridgman. Price 7/6 net. London: Sampson Low Marston & Co., Ltd.

Lubricating Oil Tests and Their Significance. By J. E. Southcombe. Price 2/6 post free. London: Germ Lubricants Ltd.

Gibbons' Air Stamp Catalogue. Third Edition, 1935. Price 1/6 net. London: Stanley Gibbons Ltd., 391, Strand, W.C.2.

Italy Seen from the Sky. London: Italian State Tourist Department, 16, Waterloo Place, Regent Street, S.W.1.

Torsional Vibration.—Elementary Theory and Design Calculations. By W. A. Tuplin. Price, 21s. net. London: Chapman and Hall.

The Internal Combustion Engine.—Vol. II. The Aero-Engine. By D. R. Pye. Price 21s. net. London: Oxford University Press.

Wings of Speed. By Sir Harry Brittain. Price 5/- net. London: Hutchinson & Co.

Aeronautical Research Committee Reports and Memoranda. No. 1595. Aileron Stability, with Special Reference to Rolling-Aileron Motion and the Influence of Frise Type Hinge Moment Curves. By A. G. Pugsley. February, 1934. Price 1/6 net.

Aeronautical Research Committee Reports and Memoranda. No. 1596. Flexural-Torsional Flutter of a Simple Cantilever Wing. By D. Williams. November, 1933. Price 1/3 net. London: H.M. Stationery Office, W.C.2.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. (The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1933

Published November 15, 1934.

8539. IRVIN, L. L. Parachute equipment. (418,209.)

8540. IRVIN, L. L. Parachute equipment. (418,210.)

8555. COATS, A. G., RUTHERFORD, W. V. D'A., HAFNER, R. and NAGLER, B. Helicopter aad rotating-wing aircraft. (418,212.)

11308. VICKERS (AVIATION) LTD. and WALLIS, B. N. Biplane wing structures for aircraft. (418,036.)

Published November 22, 1934.

11,924. DOVE, J. S. Gyroscopic instrument for aircraft and the like. (418,377.)

14,396. GORDON, C. B. Model watercraft and aircraft. (418,464.)

17,738. POBJOY AIRMOTORS, LTD., and POBJOY, D. R. Cowling for use in connection with internal-combustion engines. (418,530.)

21,692. BLACKBURN AEROPLANE AND MOTOR CO., LTD., and PETTY, G. E. Tail supports for aircraft. (418,396.)

31,066. ARMSTRONG WHITWORTH AIRCRAFT, LTD., SIR W. G. and LLOYD, J. Aeroplane undercarriages. (418,468.)

32,812. FAIREY AVIATION CO., LTD., and WILLIAMS, D. L. H. Control surfaces of aircraft. (418,450.)

33,205. SIEMENS AND HALSKE AKT.-GES. Device for automatically regulating the altitude of aircraft. (418,452.)

APPLIED FOR IN 1934

8,584. AKT.-GES. C. P. GOERZ OPTISCHE ANSTALT, and CATASTA, R. Devices for determining the position of moving aircraft at night. (418,347.)

12,765. SPERRY GYROSCOPE CO., Inc. Automatic or semi-automatic pilot for aircraft. (418,499.)